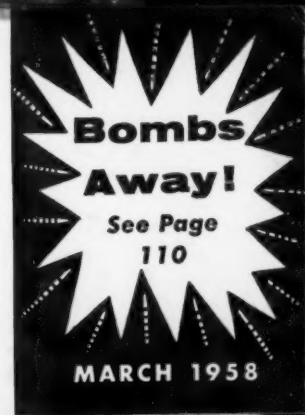


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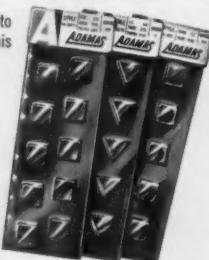
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of the World

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PRODUCTION MACHINING PARTS FOR TURBOCHARGERS

By Fred W. Vogel

The Turbocharger is a term as well as a device that is destined for greater and more widespread usage. This article illustrates and describes the more interesting operations involved in the production of turbochargers for the Cummins "Turbodiesel" Engine.



Page 102

BOMBS AWAY!

By Gilbert C. Close

Hundreds of shops throughout the nation which have become skilled in the production of precision sheet metal structures using the light metal alloys will have to become equally skilled in producing similar structures using the heavier, less workable ferrous alloys. This will call for many modifications and a few drastic change-overs from the techniques now employed with the light metals. The present article details how one shop accomplished this feat in producing aerial bombs of heavy ferrous alloys.

Page 110

WELDING PAYS DIVIDENDS

By Howard E. Jackson

The Western Blower Company of Seattle, Washington, welds everything it can . . . and now uses bolts only where it cannot weld. As a result, this company is saving 50 percent of the costs previously involved in the fabrication of volume heaters.

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this issue

MARCH 1958 • VOL. 30 • NO. 10

THE STOLEN YEARS

By Lawrence G. Derthick

This article is somewhat removed from the usual technical article appearing in *Modern Machine Shop* but because it carries a message of great import to every adult in our country we felt justified in publishing it. In his presentation, the author outlines in a clear manner the penalty we must pay for overlooking our responsibility to furnish adequate educational facilities.

Page 126

MACHINING STAINLESS STEEL

By G. J. Stevens

Are you having difficulty in obtaining a good surface finish in machining stainless steel? A solution to the problem of poor surface finish in cutting off a $\frac{5}{8}$ -inch stainless steel round is presented in this helpful case history.

Page 134

INDUSTRIAL LEADERSHIP CAN KEEP THE WORLD AT PEACE

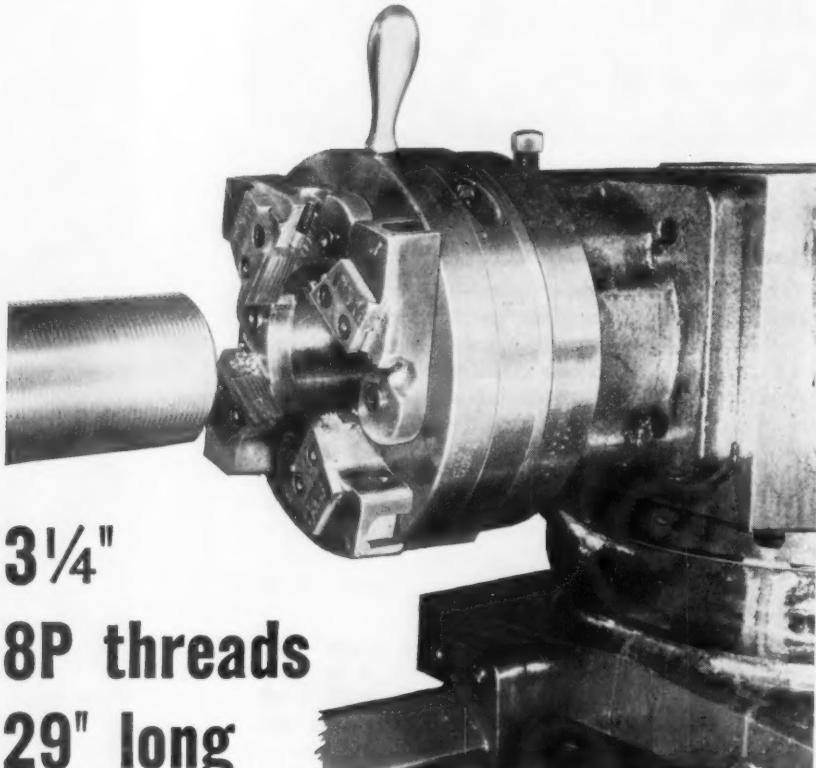
By Alfred M. Cooper

In last month's issue, you will recall, the author pointed out specific things which the industrial executive can do in order to assure his children their opportunity to continue living in a free country. In this issue, he concludes his discussion of this very timely subject. (Tear sheets of the first part of this article are available free upon request.)

Page 136



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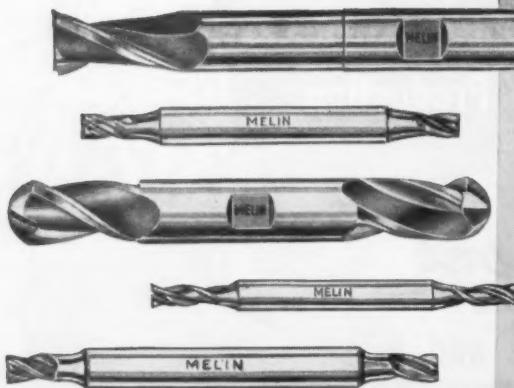
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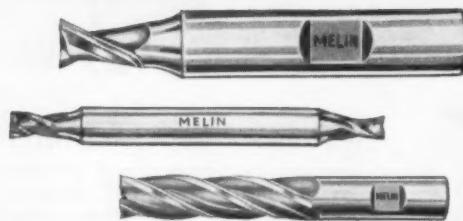
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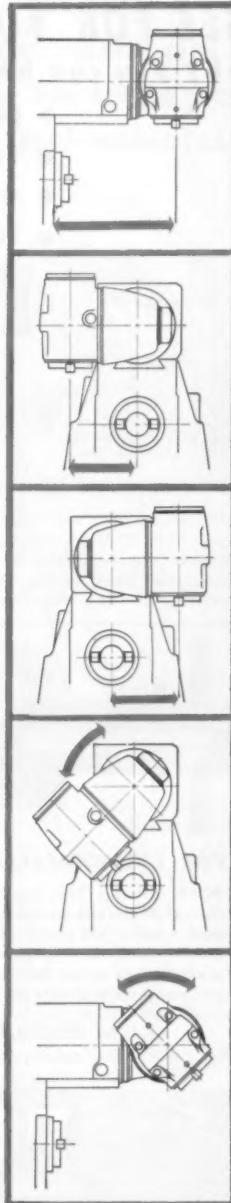
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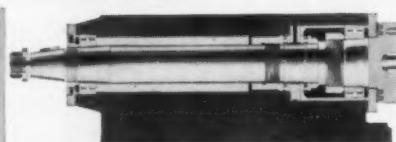
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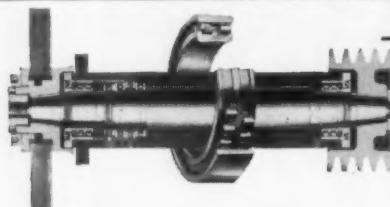
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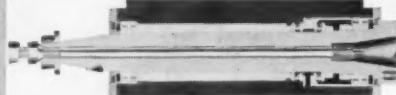
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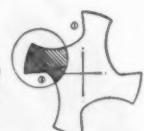
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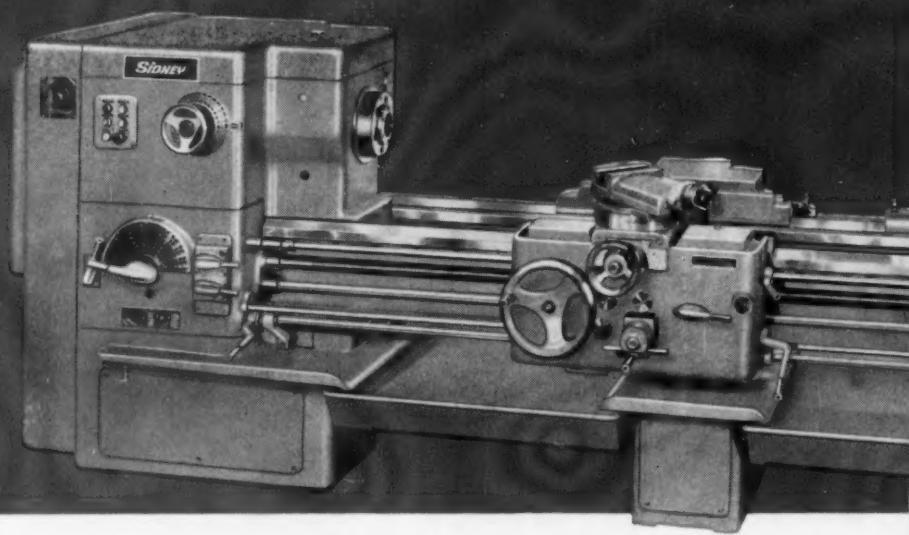
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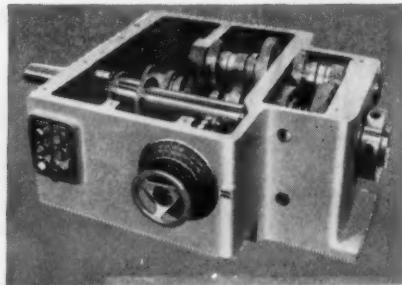
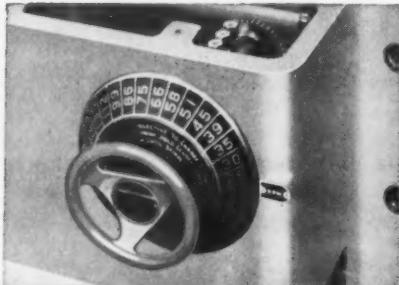
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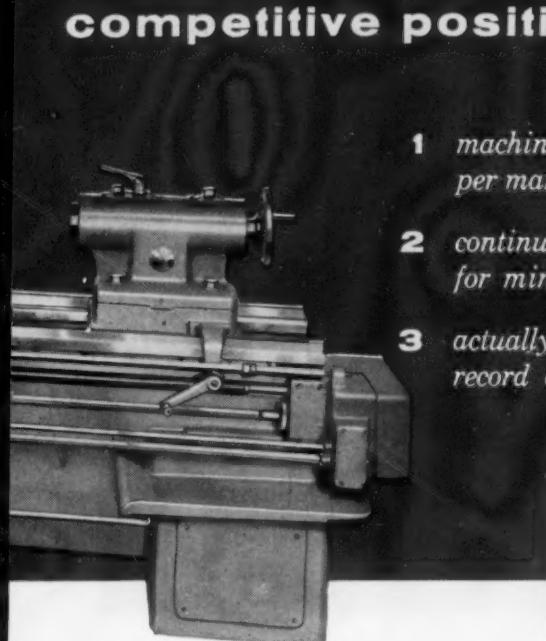
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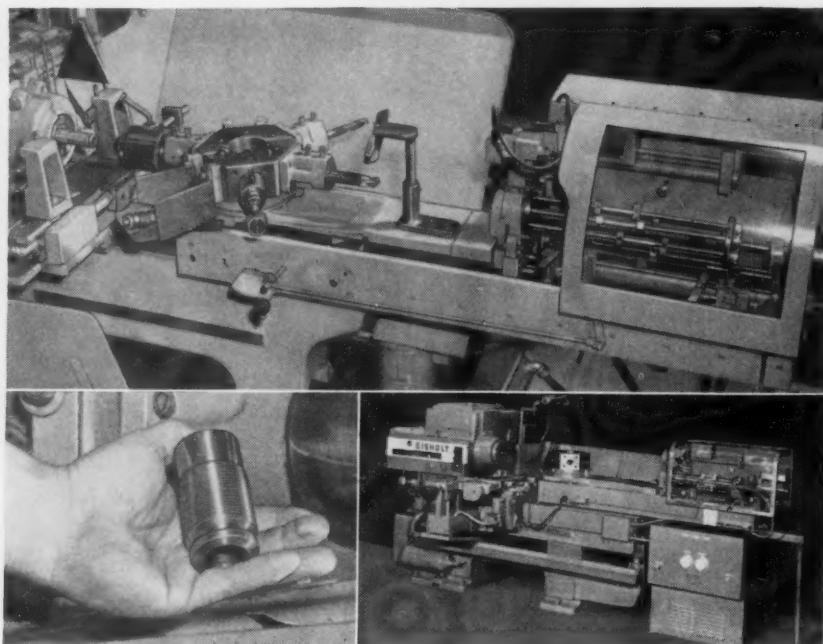
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With its massive design, reserve power and extra spindle speeds, the new Gisholt MASTERLINE Ram Type Turret Lathe is particularly adaptable to complete automatic operation with Lynn Hydraulic Drive. Contact your Gisholt Representative. He has the complete facts—and his wide experience may point the way to more profitable operation for you.

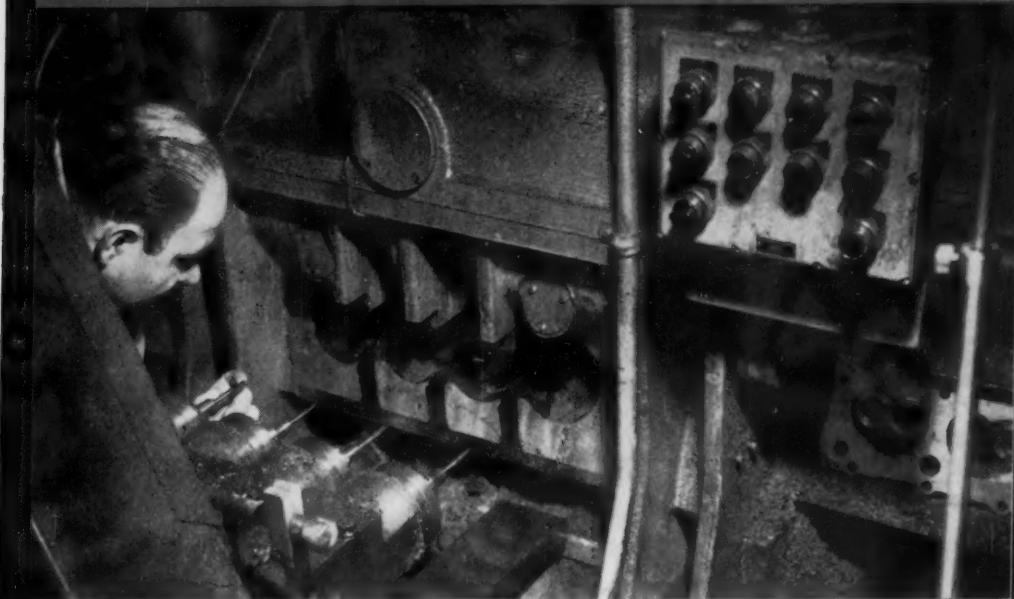


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WRITE GISHOLT TODAY for all-new, 18-page illustrated Bulletin 1174-B covering features, accessories, tools and floor plans on new Gisholt MASTERLINE Ram Type Turret Lathes.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE
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Chicago-Latrobe Carbide Bore Reamers help boost Rambler production



Reaming and chamfering in one trouble-free operation increases production on American Motors cylinder head line

Big news in the industry is the sales climb of American Motors' Rambler. At Rambler's Kenosha plant, the line is operating at capacity to meet demand.

Chicago-Latrobe Service Engineers work regularly with AM to get more and more production with greater precision into all their drilling and reaming operations. In the photo, four guide bushings are reamed and chamfered at one time—using Chi-

cago-Latrobe Carbide Bore Reamers. This unusual setup is saving time . . . keeping vital parts moving.

C-L tools for difficult drilling and reaming jobs may answer some production problem in your plant. Ask a Chicago-Latrobe distributor to bring in a C-L Service Engineer. Regardless of the size of your operation, he's at your disposal without cost or obligation.

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419 W. ONTARIO STREET, CHICAGO 10, ILLINOIS
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Drill and
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Line



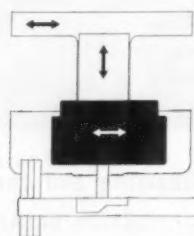
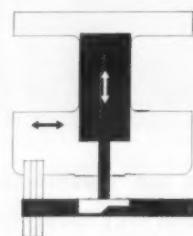
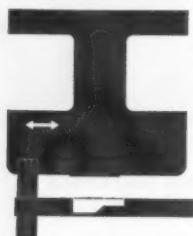
New turning idea is born...



1. Problem workpiece—spiral rotor for pumps. Roots-Connersville Blower Co., Connersville, Indiana, had been machining these rotors on a shaper. The trouble was . . .

2. Shaping just couldn't produce the wide variety of exact contours their engineers wanted. Could rotors be turned—automatically?

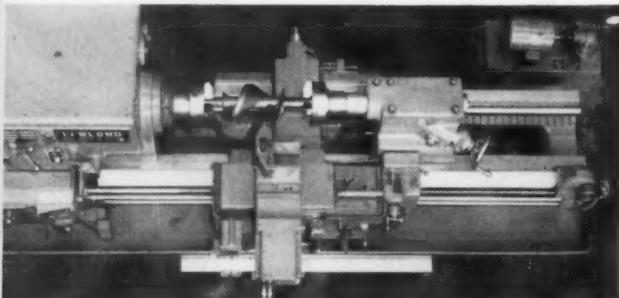
3. Why not? With special end gearing and full nut, we can "chase" the spiral shape like a coarse thread. That's easy . . . the problem is the contour.



6. Let's see how this looks in plan. The carriage provides length motion for the tool. The template carrier moves lengthwise with the carriage.

7. The cross slide gives cross travel plus automatic tool relief. The template carrier also moves "in and out" with the cross slide.

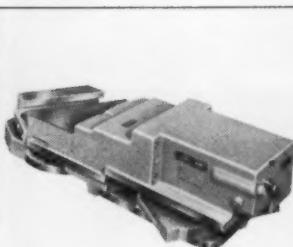
8. The special length slide gives us feed. Not continuous feed. Just tool-positioning feed that moves the stylus slightly along the template for each successive cut.



11. Here's the finished machine—the LeBlond Contour Chasing Lathe, basically a 32" Standard Duty. Modifications include: special end-gearing, full nut, special length slide, automatic cycling and special heavy duty reversing electrics.

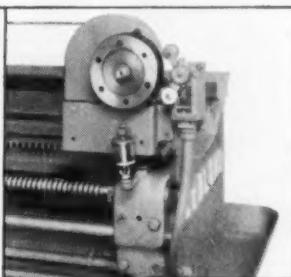
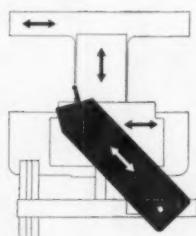
For more data circle 322

LeBlond Engineers turn trick with tracer



4. How about using Hydra-Trace? We've produced plenty of close tolerance contours with Hydra-Trace.

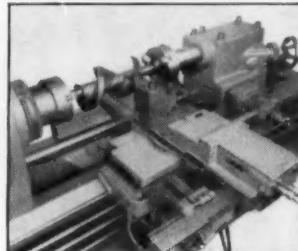
5. We'll use Hydra-Trace to position the tool (not to trace). We can mount a special length slide on the cross slide to give us feed between cuts.



9. The template controlled Hydra-Trace positions the tool for each successive cut to produce the contour. During the cut, no feed takes place. Only the chasing action.

10. One more detail. Remember, the whole action must be automatic. We'll need automatic cycling and a tool release mechanism. That does it.

12. Rotor workpiece shown has 10° lead—concave on one side, convex on the other. (Lathe chases leads from 4½" to 16") On the left hand rotor, cutting is from headstock to tailstock. On mating right hand rotor, from tailstock to headstock.



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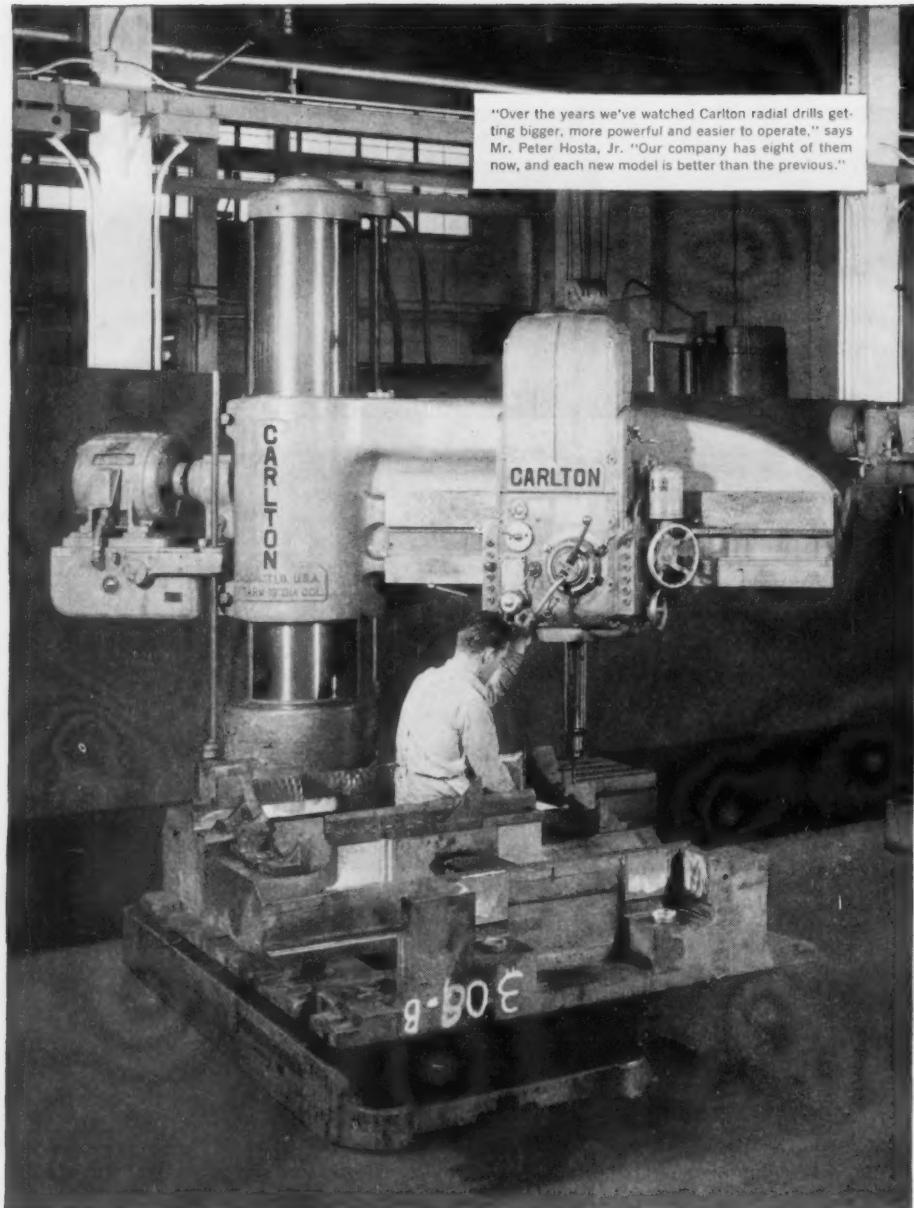
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...cut with confidence

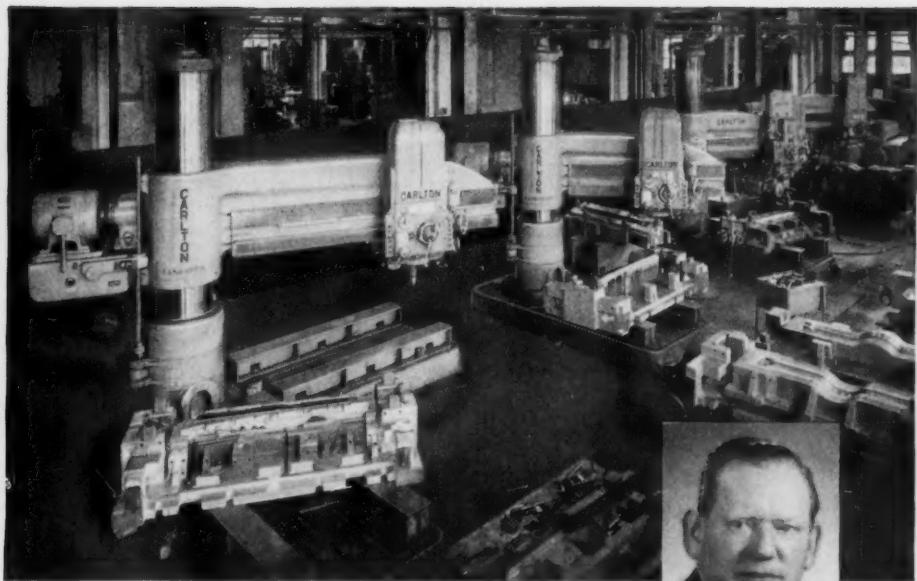


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Machine Tool Company**
Cincinnati 8, Ohio

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"Over the years we've watched Carlton radial drills getting bigger, more powerful and easier to operate," says Mr. Peter Hosta, Jr. "Our company has eight of them now, and each new model is better than the previous."



Power? Capacity?

Carltons have it! And they're real money-makers, too

That's what Peter Hosta, Jr. says. And he knows his equipment . . . because his company, Buffalo Tool & Die Mfg. Co., Buffalo, now owns and operates eight Carlton radial drills.

"We machine a lot of metal for the automotive and aircraft industries. Believe me, our work has to be good to please our customers. Those Carltons have the power and capacity to handle our type of work.

"Accuracy is the most important advantage. Carlton radial drills have completely solved the pesky problem of rejects.

"Here's the way we feel at Buffalo Tool & Die: Carlton concentrates on making good radial drills and nothing else. So how can they help bringing out the best ones in the business."

To that we at Carlton say Amen . . . and thank you, Mr. Hosta. And to metalworking management men everywhere we say this: could the Carlton power, capacity and precision performance Mr. Hosta likes so well be just as profitably applied to your drilling requirements? Why not investigate and see?

The Carlton Machine Tool Co., Cincinnati 25, Ohio

Carlton

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March, 1958

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modern machine shop

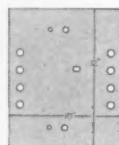
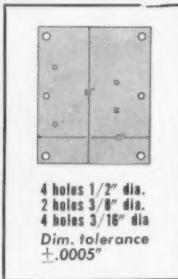
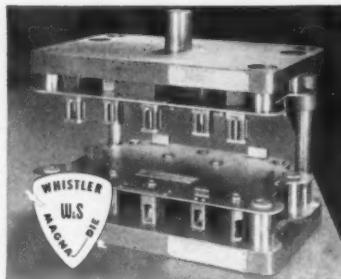
23

Whistler Magna-Dies open the way to big savings

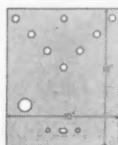
Over \$2500 saved on these four typical jobs...Here's a specific example showing how Whistler Magnetic Perforating Dies are used and re-used to push die costs down to a rock bottom low:

\$106 SAVED ON JOB NO. 1... EVEN INITIAL INVESTMENT IS LESS

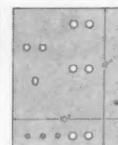
This Whistler Magna-Die unit includes a 12" x 14" die set, 10 punch and 10 die retainers, 10 punches, 10 die bushings, 10 strippers, 3 gages and one set of templets. The complete price with templets, jig bored and gages mounted for producing the 10-hole part shown at the right: \$819.00. The approximate cost of a custom die to do the same job: \$925.00. From the very start, you start to save with a Whistler Magna-Die.



8 holes 1/2" dia.
2 holes 3/8" dia.
2 holes 3/16" dia.
1 oval hole
3/8" x 1/2"
Dim. tolerance
±.0005"



1 hole 31/32" dia.
7 holes 1/2" dia.
1 hole 3/8" dia.
2 holes 3/16" dia.
1 oval hole
3/8" x 1/2"
Dim. tolerance
±.0005"



6 holes 1/2" dia.
2 holes 3/8" dia.
4 holes 3/16" dia.
1 oval hole
3/8" x 1/2"
Dim. tolerance
±.0005"

\$710 SAVED ON JOB NO. 2

All of the original punch and die parts (with the exception of 2 punches, 2 bushings and 2 strippers) are re-used here. The additional tooling required, plus bored templets with gages mounted, cost \$389.79. The approximate cost of a custom die to produce this part: \$1100. Savings pile up with each succeeding job...\$816 so far.

\$793 SAVED ON JOB NO. 3

Through the use of another punch and die retainer unit, a $\frac{1}{2}$ " punch, die bushing and stripper plus a new set of bored templets with gages, this part is produced at a die cost of \$246.81. In this case, the cost of a custom die would amount to approximately \$1040.00. Savings now reach \$1609.

\$925 SAVED ON JOB NO. 4

As more Whistler punch and die parts are accumulated, die costs for each succeeding job usually go down even further. Here, for example, only a new set of templets, jig bored to the 13-hole pattern, is needed. The cost: \$163.55. A custom die for this job would run approximately \$1089. Total savings for these first four jobs alone amount to approx. \$2535.

EACH JOB CAN BE RE-RUN AT ADDED SAVINGS, TOO!

Punch and die parts can be quickly re-assembled to re-run any one of these four jobs. All it takes is approximately 10 minutes for press changeover. Whistler Magna-Dies cut downtime and remove production bottlenecks by avoiding the extra time required to obtain custom dies. They can be used on practically any press with a minimum shut height of $9\frac{1}{2}$ " for perforating materials up to and including $\frac{3}{4}$ " mild steel.

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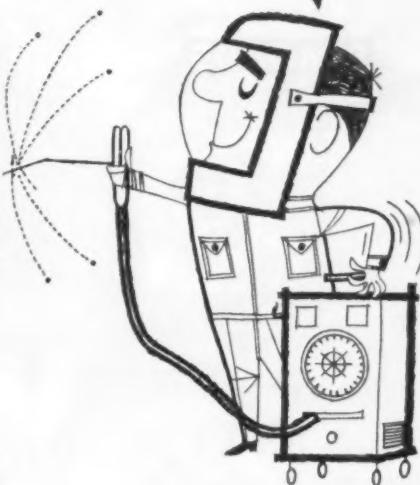
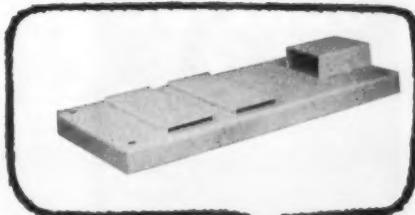


We can fabricate anything but fosses

Frankly, we haven't even tried . . .

After all, we must be reasonable. A foss is a ditch, trench, canal or moat. How could we lay out, shear, punch, bend, flame cut or assemble a canal? How could we weld, stress relieve, sand blast or machine a moat? It isn't being done these days.

In the field of weldments, Littleford is on solid ground, 175,000 sq. ft. of it actually, loaded with modern fabricating facilities manned by 300 skilled craftsmen. Littleford weldments save your time, equipment and money. Send today for your free copy of our new 16-page catalog—it's free. Better still, send us your blueprint for prompt estimate.



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behind Every
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**SIMONDS SERVICE INCLUDES
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BOTH TYPES**

Sure you get straighter cutting, smoother finish and greater satisfaction when you select Simonds Segmental Saws — with your choice of tongued or slotted segments. But you get a lot more!

You get fast, dependable service at Simonds Factory Branches from skilled Simonds servicemen who really know their business.

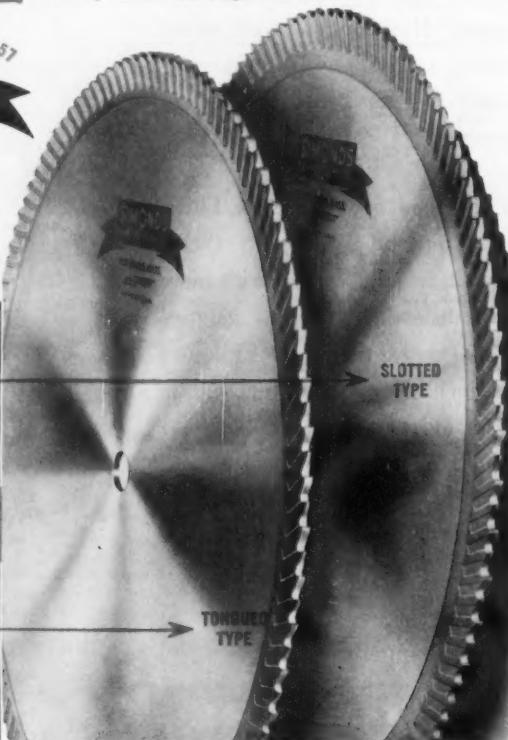
In Sharpening — Newest automatic sharpening machines operated by men who have an instinctive "feel" for the proper cutting edge combine to put "new life" in your favorite saws.

In Repairing — Specially designed equipment handles flattening, straightening, tensioning, riveting, and finish grinding.

In Re-segmenting — Specialists using the latest techniques and machines have the know-how to do any re-segmenting job quickly to your complete satisfaction.

For complete Segmental Saw Service send your saws to any of these Simonds Factory Branches: 1350 Columbia Road, Boston, Mass. • Hawn Ave. and Simonds Drive, Shreveport, La. • 3323 West Addison St., Chicago, Ill. • 228 First St., San Francisco, Calif. • 6500 N.E. Halsey St., Portland, Oregon.

NOTE: Simonds Segmental Saws (either tongued or slotted type) are made of tough shock-resistant alloy steel saw plate with accurately fitted High Speed Steel toothed segments securely riveted to the rim. Saws are also available with carbide tipped segments for cutting aluminum and magnesium.



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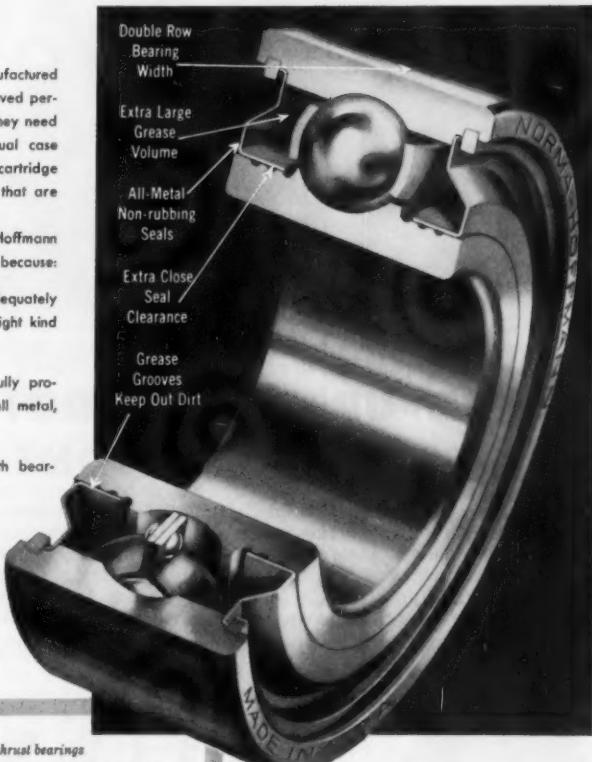
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- * "Cartridge" double row width bearings are complete units ready for installing and *forgetting*.

All Norma-Hoffmann bearings are designed to improve operating efficiency and reduce costs. Get complete details now — write for descriptive literature.



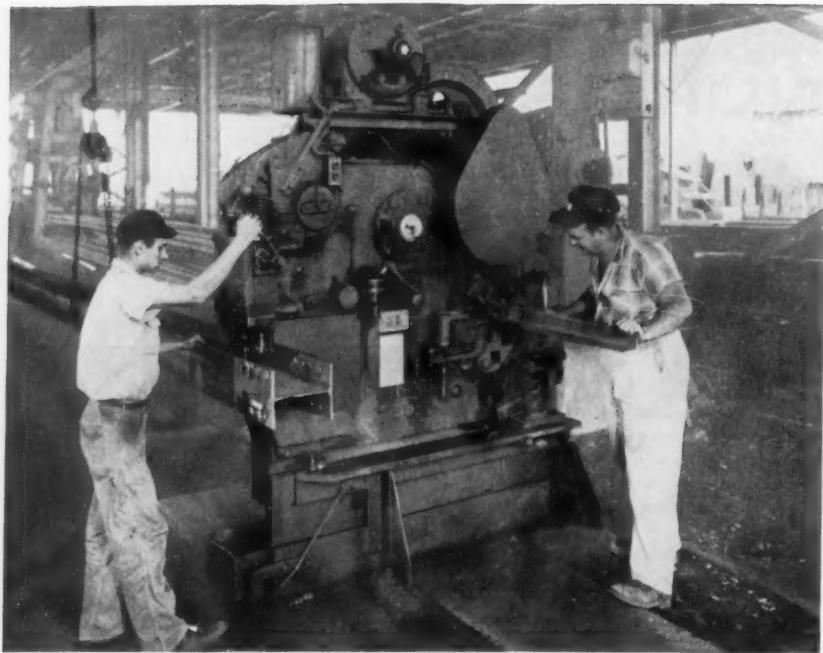
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World's Greatest Toolmakers

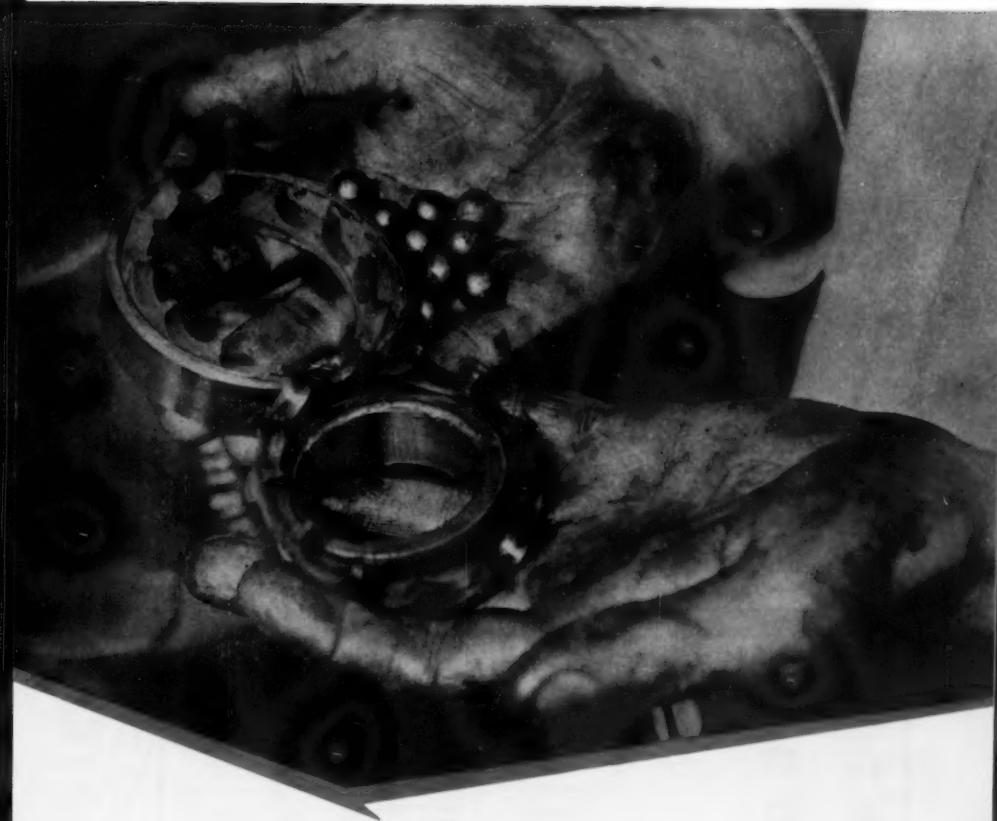


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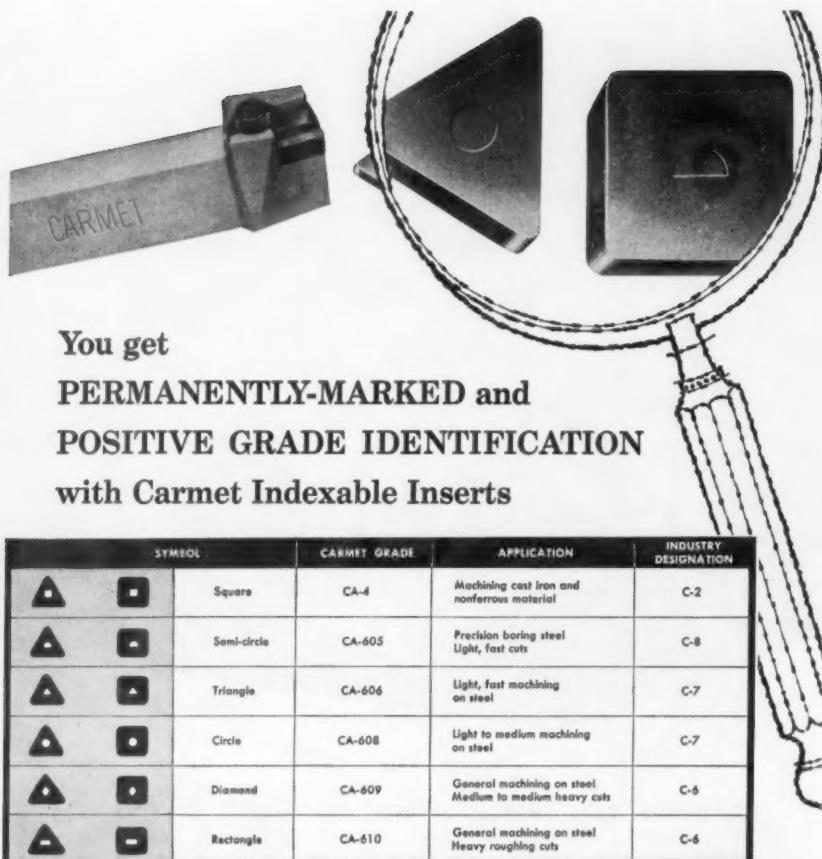
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▲ ▲	Triangle	CA-606	Light, fast machining on steel
▲ □	Circle	CA-608	Light to medium machining on steel
▲ △	Diamond	CA-609	General machining on steel Medium to medium heavy cuts
▲ ▱	Rectangle	CA-610	General machining on steel Heavy roughing cuts



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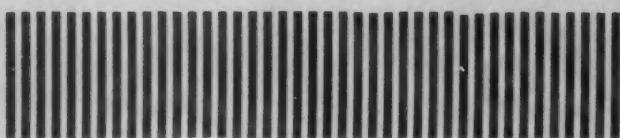
Circle KEY numbers (NOT PAGE NUMBER) for more information on items described or advertised in this issue.

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modern
machine
shop

431 MAIN ST.
CINCINNATI 2, OHIO

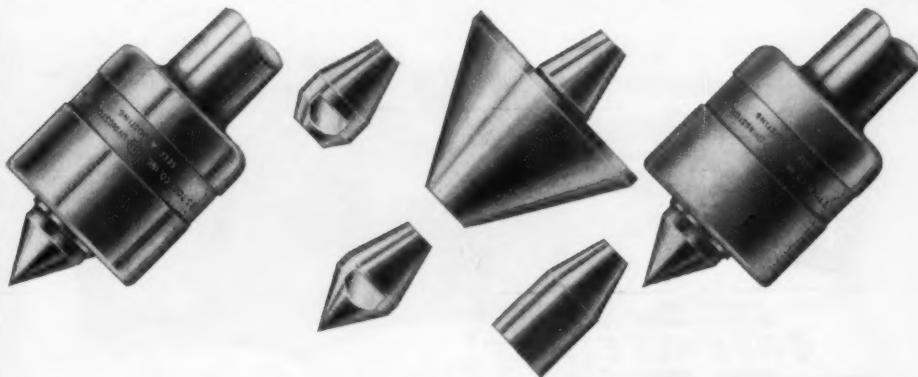


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CINCINNATI, OHIO



Famous Perfection
Grinding Live Center

Accurate Detachable Points
H.S.S. and Carbide

Expansion Compensating
Lathe Centers

ANNOUNCING THE FIRST COMPLETE LINE OF PRECISION-BUILT LIVE CENTERS

INCLUDING 5 TYPES OF
EXPANSION COMPENSATING CENTERS

- the only complete line
- the only guaranteed self-adjusting live center

INTRODUCING J & S Tool Company's complete new line of live centers with accuracy better than .0001", with these features:

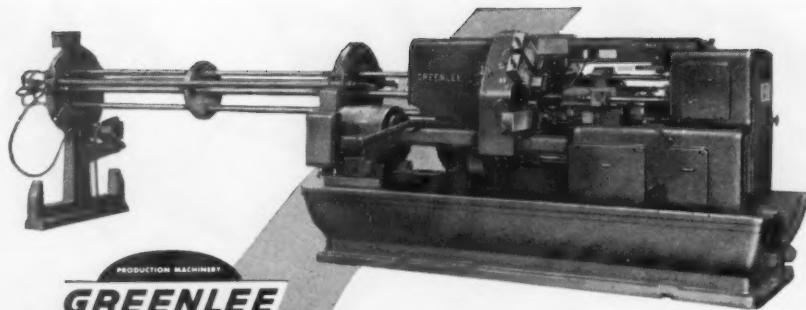
- Guaranteed one year.
- Self-adjusting bearing take-up.
- RPM speeds up to capacity of present-day machines.
- Correct capacity rating.
- Hardened and ground throughout.

Write today for a free copy of the J & S Live Center Catalog.

J & S TOOL CO., INC.

880 Dorsa Avenue
LIVINGSTON, NEW JERSEY

J & S TOOL CO., INC., ALSO MANUFACTURES FLUIDMOTION WHEEL DRESSERS
CLAMPS • NO-BEND MILLING ARBORS AND CLAMP/CUT MILLING VISES
For more data circle 334 on Postpaid Card

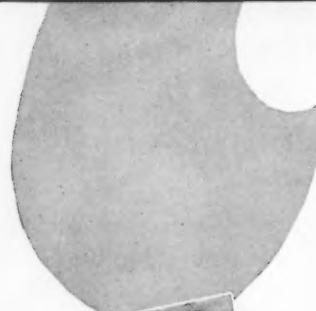


PRODUCTION MACHINERY

GREENLEE

AIR-FEED

AUTOMATIC

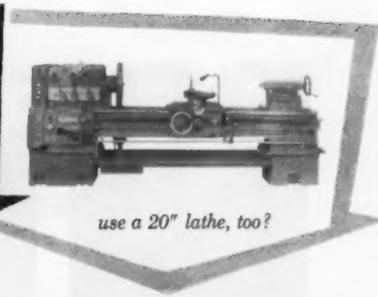
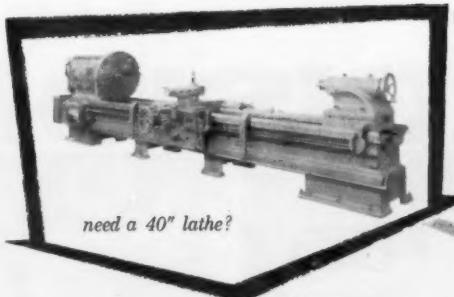


Write today for Catalog A-405, or better still, have the Greenlee man call and show you the way to more profitable production with this machine.

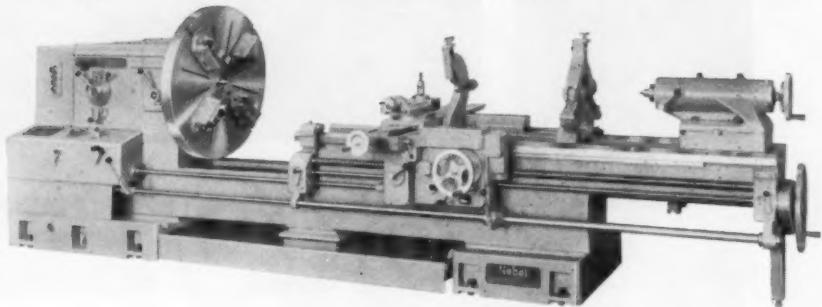
- 1 Permits Greater Job Versatility**
- 2 Easily Adapted To Multiple Feedouts**
- 3 Provides Longer Stock Feedout**
- 4 Eliminates Stock Scoring**
- 5 Reduces Stock Reel Noise**
- 6 Eliminates Stock Pushers**
- 7 Eliminates Feedout Cams**



For more data circle 335 on Postpaid Card



Why buy 2? One Nebel will do!

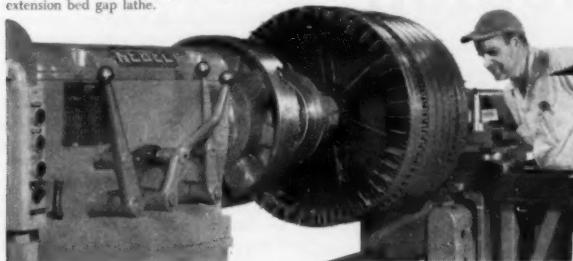


Save money on initial investment . . . with the Nebel extension bed gap, the one lathe that does the work of two . . . occupies the floor space of one machine . . . requires just one investment.

Make money with the Nebel extension bed gap lathe. Because it offers adjustable swing and center distance capacity, it can be the most useful and the most frequently used lathe in your plant. Use it as a gap lathe—as a standard lathe—and even as a vertical boring mill.

Room to spare: 32" diameter, 4500-lb pump rotor swings easily in the wide, deep gap of the Nebel series AG 20"/40" extension bed gap lathe.

Check Nebel extension bed gap lathes. Made in three sizes: AG 20"/40" medium duty, G 28"/50" heavy duty and XG 20"/40" heavy duty. Or Nebel removable block gap lathes; made in 16"/27", 20"/30" and 25"/40" sizes. Write for free descriptive bulletins. Nebel Machine Tool Corp., 3409 A Central Parkway, Cincinnati 25, Ohio.



For more data circle 336 on Postpaid Card

PRECISION



TAPER
(and straight)



PLANETARY

OUTFEED wheel
to grind hole,
INFEED to grind
O. D. of part

Axis of wheel
spindle - high
speed rotation

Planetary path of
wheel spindle around
main spindle axis -
slow hand rotation

CONTOUR
(with head)

MOORE- FOSDICK JIG GRINDER

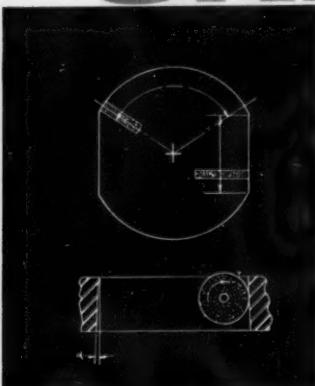
A new degree of speed, convenience and capacity is brought to precision grinding in the Moore-Fosdick Jig Grinders. This combination of the unique Moore Grinding Head with Fosdick Jig Borer Tables makes possible advantages never before available.

All standard jig grinding operations can speedily and conveniently be accomplished on the Moore-Fosdick, in addition to many which were formerly known as "trick" operations. Both straight and tapered holes can be located and ground, as well as contours consisting of radii and tangents or chordal surfaces.

The angular and indexing device built into the main spindle and the slot grinding attachment permit quick, accurate grinding of any contour, regular or irregular. Setting work on a rotary table is unnecessary except for angular surfaces. Chop grinding removes stock rapidly and makes contour grinding even faster.

An infinite range of grinding speeds—from 12,000 to 60,000 rpm—allows accurate control

GRINDING OF LARGE WORK



CONTOUR (with slot grinder)

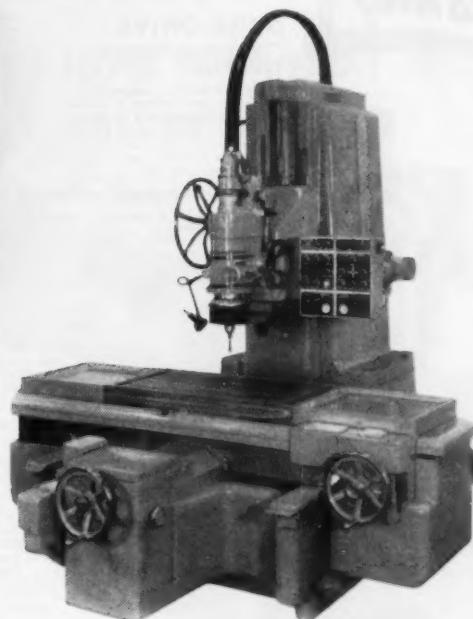
of grinding and stock removal. Long-lasting precision is assured by quality construction and by many features that provide dimensional stability, including spindle-housing heat control.

The machine may be ordered in any one of three models, one of which comes in two sizes. All will give accuracy of $\pm .0001"$.

Measuring is accomplished with measuring rods and inside micrometers or with Direct Dimension Measuring, where dimensions are simply set from blueprint to direct reading drum dials. Automatic positioning is also available.

Numerical control by punched tape or cards is available.

For a complete description of the various grinding operations, measuring systems and other machine features—many exclusive with Moore-Fosdick, write today for your jig grinder catalog.



Ask for Bulletin JG-S.

NEED DRILLING EQUIPMENT?
GET A PROPOSAL FROM FOSDICK!

FOSDICK

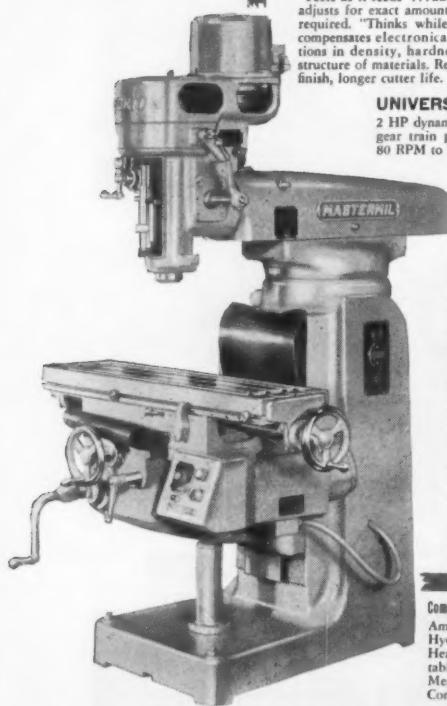
THE FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO

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Eventually you'll buy a

GORTON MASTERMIL

here's why



DYNA-DRIVE

"The Torque-Thinking"
Table Feed

"Feels as it feeds" . . . automatically adjusts for exact amount of torque required. "Thinks while it works", compensates electronically for variations in density, hardness, molecular structure of materials. Result? Superbly fine finish, longer cutter life.



UNIVERSAL SPINDLE HEAD

2 HP dynamically balanced motor with belt and gear train provides wide range of speeds from 80 RPM to 5,600 RPM. Head swivels 90° left or right, head, ram and turret rotate 180°. Cross movement 14 inches. Push button starting.



DOWN FEED INFINITELY VARIABLE

Feeds may be varied infinitely from 0" to 5" independent of spindle speeds. High efficiency belt drive. Direction and rate of feed separately controlled.



PERMANENT ACCURACY BUILT-IN

Distortion is prevented by extra heavy one-piece column cast with over-size ribbing . . . extra heavy alloy steel turret clamping bolt (1½" dia) with 3-point clamping action . . . heavy dovetail way full length of vertical column face . . . extra large table, knee and 24" saddle (2" longer than table travel) . . . square lock bearings with long, narrow guide between knee and saddle . . . positive locks . . . extra heavy feed screws . . . bearing surfaces hand-scraped.



Complete Versatility Through Attachments Built-In or Field Installed.

Among such equipment is, Trace-Master Hydraulic Tracer Control, Duplicator Tracer Head and/or Table with base, saddle and table in one unit, 6" Raising Block, End Measuring Rods and Dial Indicators, Self-Contained Coolant System.

Write for Bulletin 2699-1703.



© 1958 George Gorton Machine Co.

GEORGE GORTON MACHINE CO.

1703 RACINE STREET

SINCE 1893 Tracer-Controlled Pantographs, Duplicators—standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 339 on Postpaid Card

RACINE, WISCONSIN



A8-1008

Weldynamics*



* ARC WELDING AT WORK CUTTING COSTS



HOW YOUR NEXT JOB
WILL BE HANDLED
FOR LESS COST

For lowest cost, Weldynamics indicates that both AC & DC welding currents are needed to take full advantage of today's high-speed electrodes. One machine, Idealarc, fills this need . . . does the work of two welders. As a result, you need fewer machines, work scheduling is simplified, there are fewer machines standing idle.

Lincoln men, trained in Weldynamics, will show you how to apply these cost cutting advantages to your specific jobs—with the latest methods and electrodes available today.

Idealarc 180, 250, 300, 400 and 500 amp sizes. Available as AC or AC/DC welder. Can be purchased with AC only, adding DC later. Operates on single phase power. Write for Bulletins SB-1364 and SB-1343.

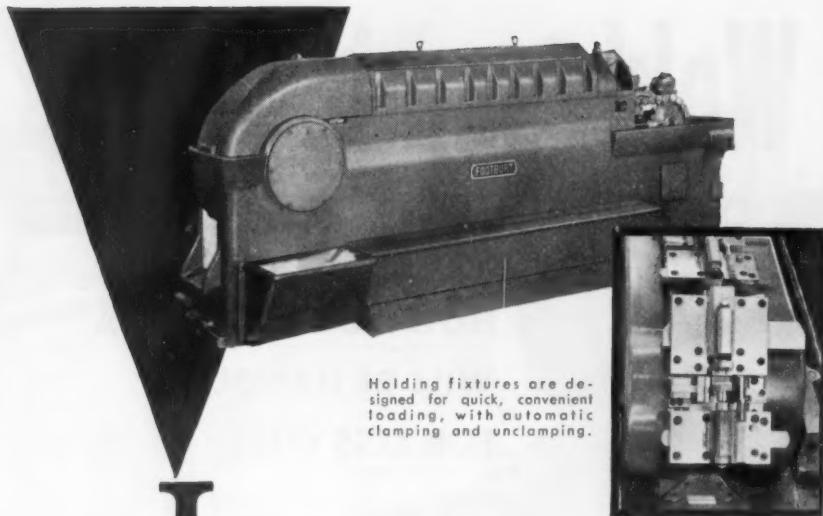


The World's Largest Manufacturer
of Arc Welding Equipment

© 1958 The Lincoln Electric Company

LINCOLN

THE LINCOLN ELECTRIC COMPANY, DEPT. 3517, CLEVELAND 17, OHIO
For more data circle 340 on Postpaid Card



Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.

L OWER COST... PER PIECE WITH SURFACE BROACHING OF SMALL PARTS



In many plants where large quantities of duplicate metal parts are being machined, substantial savings are being made through the adoption of surface broaching. Production is exceptionally high, close tolerances are maintained, and tool maintenance costs are much lower than with ordinary methods. Foote-Burt engineers, pioneers in this advanced machining method, have had a wide experience in applying surface broaching, in many fields.

THE FOOTE-BURT COMPANY

Cleveland 8, Ohio

Detroit Office: 24632 Northwestern Hwy., Detroit 35, Mich.

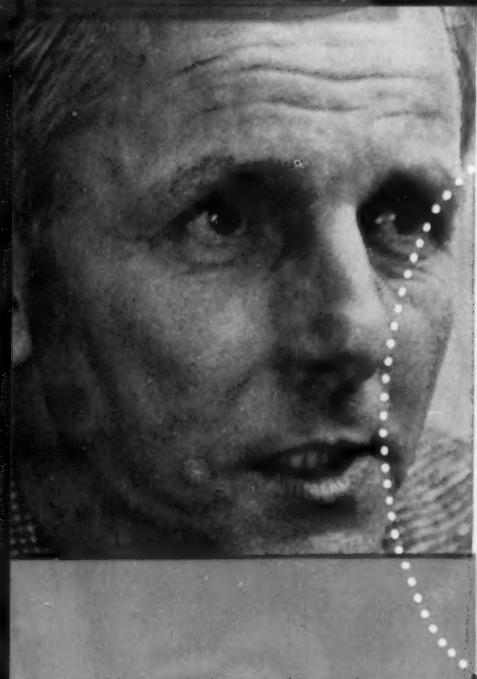
ENGINEERED FOR PRODUCTION

Write for Circular No. 503

FOOTBURT

PIONEERS IN SURFACE BROACHING

For more data circle 341 on Postpaid Card



"I'll pay for this drill
only **once**...it costs
less to buy accuracy
before installation!

I pay for quality and accuracy at the start, then make my savings through lower costs per job. And, it's much easier to get jobs when costs aren't loaded with a lot of expensive downtime and rehandling."

**It's a better buy...right across
the production board!**

CINCINNATI-quality...

GENERAL PURPOSE Royal Drills—16" size with $\frac{5}{8}$ " capacity, 18" with 1" capacity. Standard bench and floor models, and production bench types.

SLIDING HEAD Drill—16" and 24" Medium Duty bench and floor types with 1" capacity; 21" and 25" Heavy Duty floor type with $1\frac{1}{2}$ " capacity. Conventional drive, or INFISPEED variable speed drive.

STATIONARY HEAD Drill—Economical 21" floor model with $1\frac{1}{2}$ " capacity.

RADIAL Drill—3' Arm $7\frac{1}{2}$ " Column model with $1\frac{1}{4}$ " capacity. HARDCLAD® flame-hardened column.



Contact your CL&T Dealer, or write us direct for catalogs on the drill types you need.

Improved Machining Through Research

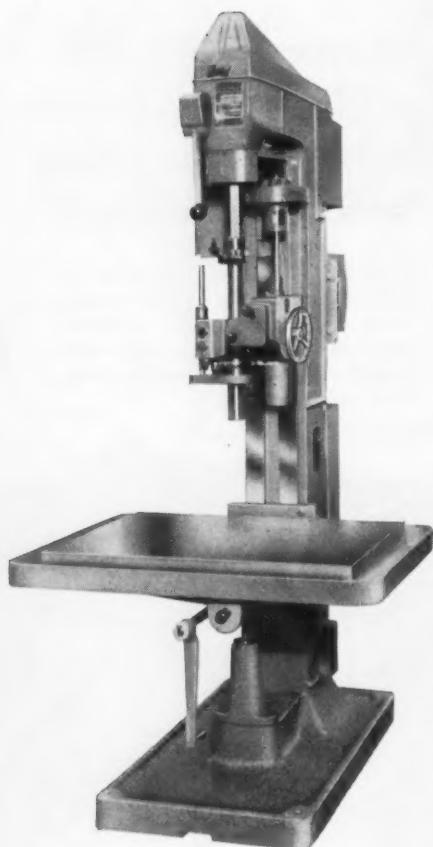
CINCINNATI LATHE AND TOOL CO.

3207 Disney Street • Cincinnati 9, Ohio

"Tray-Top" Lathes / "Cincinnati" Drilling Machines / "Spiropoint" Drill Sharpeners.

For more data circle 342 on Postpaid Card





automatic cycle drilling machine

You can chop your time costs with automatic set-ups on this new Avey machine, and still take advantage of the low cost and flexibility of a standard unit.

Adjustable rapid power traverse, feed, and rapid return of the spindle are the features which permit automatic transfer or rotary index fixturing.

At the same time, you get adjustable feeds, speeds, table travel, head travel, and Avey's advanced spindle construction.

The machine is available with No. 2, 3, and 4 Morse Taper; 1 to 3 HP motors; single or multiple spindles. Your request for additional information will be promptly answered. Avey Division, The Motch & Merryweather Machinery Co., Box 625, Cincinnati 1, Ohio.

another first by



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a COMPANION in ACCURACY for YOUR JIG BORER



THE
NICHOLS
TOOL ROOM
MILLER
costs only
\$2655*

*FOB Waltham, Mass., complete with 1 HP motor drive and standard equipment.

MANUFACTURED BY W. H. NICHOLS COMPANY

National Distributors

The ROBERT E. MORRIS Company

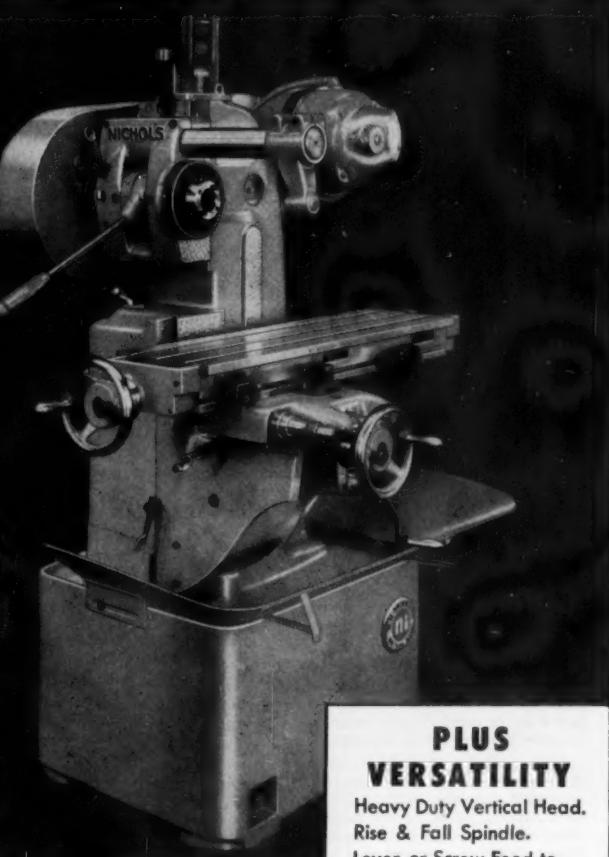
REMA Sales Division

5004 FARMINGTON AVENUE, WEST HARTFORD 7, CONN.

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March, 1958

modern machine shop 43



PLUS VERSATILITY

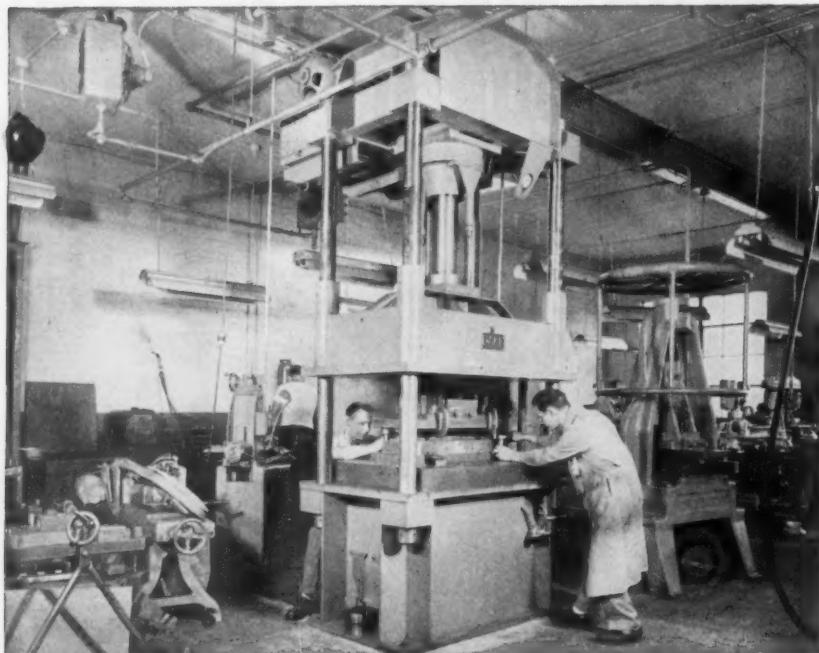
Heavy Duty Vertical Head.

Rise & Fall Spindle.

Lever or Screw Feed to
table.

Full line of accessories.

Ask for brochure "The
Millers that use their
Heads". Free-loan educa-
tional films available.



The diemaker who made a nuisance of himself

This is the story of Three Star Manufacturing Co.—a custom diemaker who serves a number of manufacturing plants in Chicago.

As in most such shops, his only means of trying out dies was a hand power screw press which sometimes needed six or seven men to get the needed pressure.

Large dies had to be tried out on his customers' production presses . . . which required drayage (\$15 to \$20 each way) and interruption of his customers' production. It meant both expense and nuisance to his customers and himself every

time a die had to be tested.

Now he has ended the nuisance by installing the press shown above in his own shop. It not only saves time and money, but avoids the embarrassment of having workers in his customers' plants see and know that occasionally a die must be taken back for adjustment.

Specifications for DAKE single-acting and double-acting die tryout presses in eighteen electrically operated models are contained in Bulletin 330. Write today for your copy!

DAKE CORPORATION, 612 Robbins Rd., Grand Haven, Mich.



Arbor
Presses



Hand-Operated
Hydraulic



Power-Operated
Hydraulic



Guided
Platen



Gap Type
Presses



Movable
Frame

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Now-A LOW-COST LAPMASTER

*Specifically
Designed for
Maintenance
Lapping*

new

*Lapmaster®
MODEL 10*



Saves Time and Money On:

VALVE SEATS • MECHANICAL SEALS
COMPRESSOR DISCS • DIESEL INJECTOR
AND OTHER MISCELLANEOUS PARTS

- Faster than old lapping methods.
- Consistently laps to flatness within .0000116" and micro-inch finishes of 2 to 3 RMS.
- Operator need not be experienced.
- Handles parts up to 7" diameter to meet all usual maintenance lapping needs.
- Will handle parts of any shape or form...any metal, ceramics or plastic.
- Automatically controlled lapping cycle.
- Size: 18" x 13" x 12". Weight: 133 lbs.
- Operates on any 110 volt—60 cycle—single phase outlet.

NO TIME LOST

in Reconditioning

Lap Plate with Exclusive
LAPMASTER PRINCIPLE



No down time for truing lap plate
...conditioning rings automatically
keep plate flat and true.

Lapmaster
...THE
MACHINE THAT PUT
PRECISION LAPING ON A
PRODUCTION BASIS

WRITE FOR THE COMPLETE LAPMASTER STORY

Write for bulletins describing
the Lapmaster line and
chart on measuring flatness.



A product of
Crane Packing Company

6418 OAKTON ST. • MORTON GROVE, ILL. (Chicago Suburb)

In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

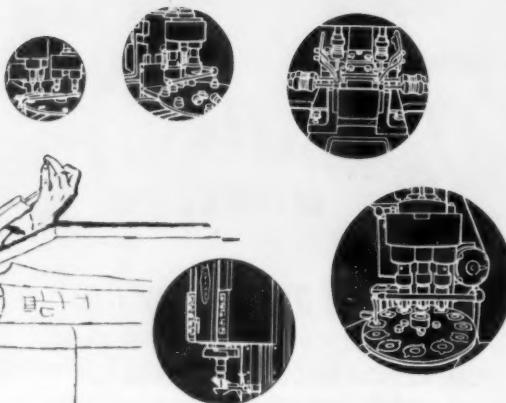
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March, 1958

modern machine shop 45

PRECISION MACHINE TOOLS FOR ANY JOB ARE MADE BETTER BY

KAUFMAN

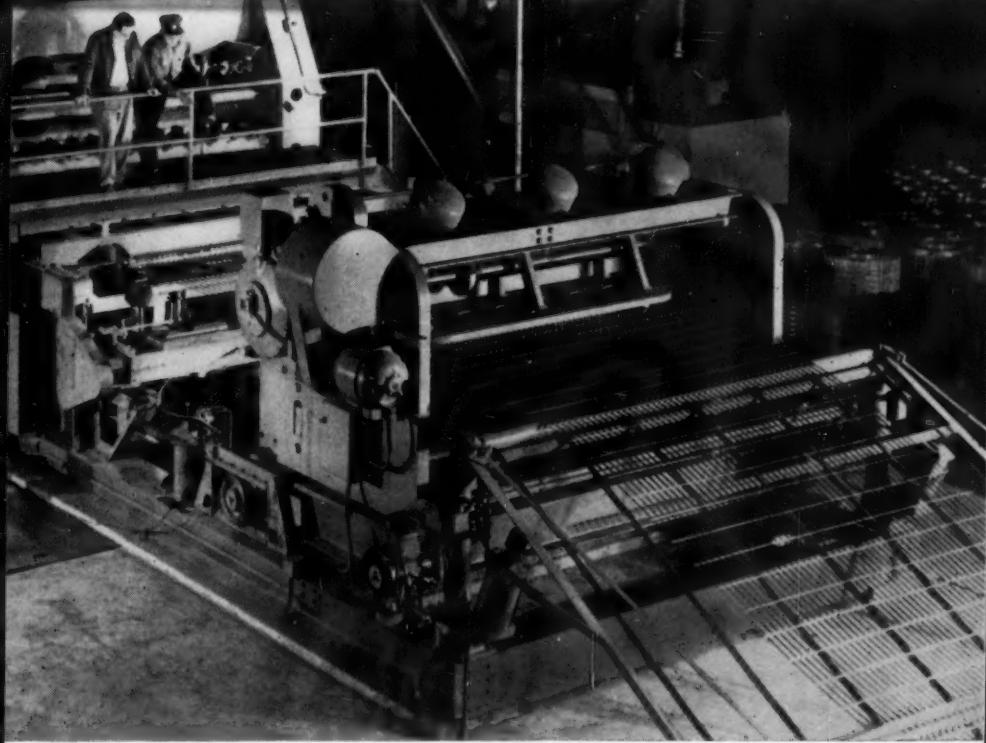


Trying to solve a knotty problem? Kaufman Drilling and Tapping Machines — assembled with our standard units or custom-made to your order — can help you cut production costs. From the engineer's drawing board to final installation, Kaufman's time-proven "know how" is saving money for many of the nation's leading manufacturers. Whether you need a machine for single or multiple operation or a machine for a new, unusual job — see Kaufman. Write or telephone for full information today!



KAUFMAN MFG. CO.
551 S. 29th Street Manitowoc, Wisconsin

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Cincinnati Shear cuts wire mesh at Pittsburgh Steel

The Cincinnati Shear shown is part of an automatic wire welding machine at Pittsburgh Steel Company, Monessen, Pennsylvania. The machine produces wire mesh and fabric used for concrete pipe, buildings, and other applications. The photograph shows the shear cutting forty-seven 2/0 gauge (.331") wires per stroke. The wire is low carbon, cold drawn steel. Other jobs require shearing mesh with wires up to 1/2" diameter.

This shear was specially engineered for this type of application. Because cuts are heavy and production is continuous, Cincinnati dependability is essential.

Standard Cincinnati Shears offer such productive features as powerful hydraulic hold-downs, all-steel interlocked construction, and one-clearance shearing of different metal thicknesses.

Write Department G for Shear Catalog S-7R.

Shapers / Shears / Press Brakes

THE **CINCINNATI**

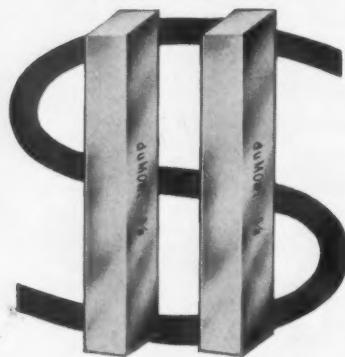
SHAPER co.

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Cincinnati 11, Ohio

du MONT balanced TOOL BITS



SAVE YOU MONEY

An almost perfect balance of *toughness, wear resistance and heat resistance* gives duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.

Clip the coupon to get full information on these long-life, high speed tool bits, ground square and rectangular.

The duMONT CORPORATION,
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST S to

Name

Company

Address

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48 modern machine shop

Meetings

Important Meeting

Dates



March 9-11 • American Machine Tool Distributors' Association, Spring Meeting, The Roosevelt, New Orleans, La. Association headquarters: 1900 Arch St., Philadelphia 6, Pennsylvania.

March 12-15 • Pressed Metal Institute, Annual Spring Technical Meeting, Sheraton-Cadillac Hotel, Detroit. Institute headquarters: 3673 Lee Rd., Cleveland 20, Ohio.

March 17-21 • Nuclear Congress and Atomic Industry Trade Show, International Amphitheatre, Chicago. Information: International Exposition Inc., 12 S. 12th St., Philadelphia 7, Pennsylvania.

April 14-17 • Design Engineering Show, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, New York.

April 14-18 • American Welding Society, Annual Meeting and Welding Show, Hotel Statler and Kiel Auditorium, St. Louis. Society headquarters: 33 W. 39th St., New York 18, New York.

May 1-8 • American Society of Tool Engineers, Annual Meeting and Tool Show, Philadelphia Convention Center, Philadelphia. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.

March, 1958



The Candy with the Hole in the Middle



*The Drill Bushing
with the Hole
in the Middle **

* Our 100% concentricity inspection means every hole is EXACTLY centered. Another "Life Saver" for you!

American
DRILL BUSHING CO.

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Los Angeles 58, Calif.

Send for free catalogs

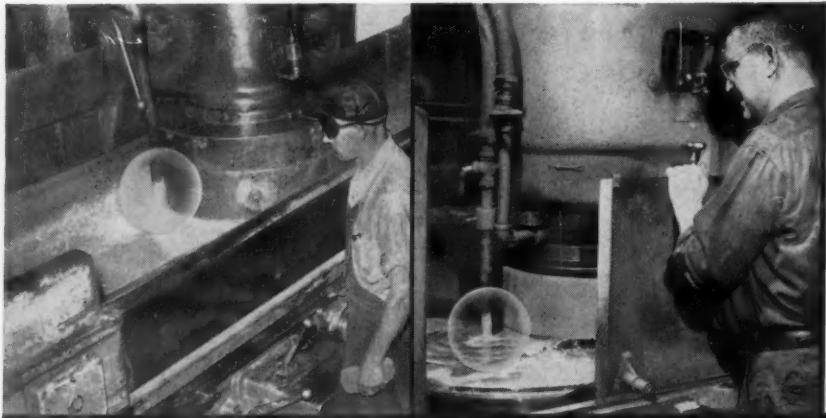


SEE US IN PHILADELPHIA —

BOOTHS 1749 AND 1753 —

1958 ASTE TOOL SHOW, MAY 1-8

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When you surface grind with segments

Take advantage of this COMPLETE Line

*... and add the profit-boosting "Touch of Gold"
to any surface grinder*

You can be sure that switching from grinding wheels to Norton abrasive segments brings powerful, profit-building "Touch of Gold" benefits to very many jobs.

Because —

Norton makes segments in every required shape and size and in exactly the right abrasive and bond for best results in the widest variety of surface grinding

— on ferrous and non-ferrous metals and on work pieces ranging from boiler plate to the hardest die steels, die sets or blocks.

Norton segments are made in many ALUNDUM* abrasives. Of these, 32 ALUNDUM abrasive is particularly suited for fast stock removal and heavy feeds. 37C CRYSTOLON* abrasive, unequalled on hard cast iron and soft non-ferrous

metals, is also available. And diamond segments are also furnished, if desired, for ceramics, quartz and glass.

Bonds include the G and BE — both vitrified — as well as resinoid bonds. Structure can be either regular or the open (induced pore) which is especially advantageous for many jobs. In the field of surface grinding, users have reported that the G Bond — most efficient vitrified bond ever developed — results in new speed and economy.

With this broad range of abrasives and bonds to choose from you can count on much faster production rate at considerably lower costs. And when you mount these cost-cutting segments in Norton chucks — designed to fit several machines — you safeguard performance and profits.

Ask Your Norton Distributor for the booklet, "The A.B.C. of Surface Grinding." Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1803



*Making better products...
to make your products better*

NORTON PRODUCTS

Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING DIVISION
Coated Abrasives • Sharpening Stones
Behr-cat Tapes



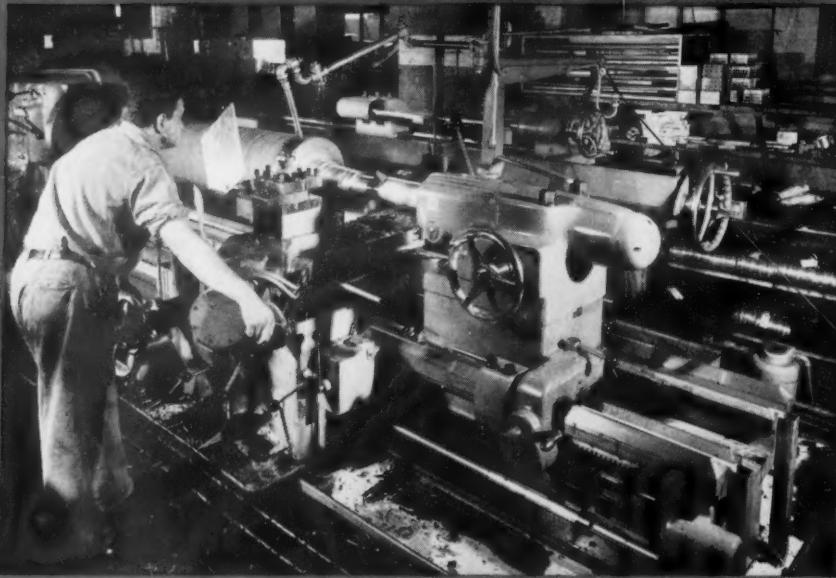
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March, 1958

modern machine shop 51

FROM **12½ HOURS...**
TO **4½ HOURS...**

plus BETTER FINISH



R. Hoe & Co., Inc., New York world renowned manufacturers of printing presses, has actually accomplished this in the machining of their impression cylinders.

Using a 32" "AMERICAN" Hydraulic Tracing Lathe, the cylinder journal shapes are generated from a template and the 15" diameter cylinder body is turned straight without the template control.

The all-hydraulic tracing unit in combination with the accuracy and rigidity inherent in "AMERICAN" lathes insures the highest quality of work both from

the standpoint of accuracy and fine finish.

With production costs constantly reaching new peaks, industry simply can't afford to ignore such savings from modern equipment. Where else could such a magnificent return upon an investment be secured, and how else can costs be lowered to meet an increasingly competitive market?

More production per man hour is the answer and the only answer to spiraling costs—modern, high production machinery is the answer to greater production per man hour.

Bulletin No. 135 gives a complete description and shows many examples. It's yours for the asking.

THE AMERICAN TOOL WORKS CO. CINCINNATI 2, OHIO, U.S.A.

LATHES AND RADIAL DRILLS

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NEW YORK

"An irregular-shaped hole being ground to within .0002" on the No. 2 Moore Jig Grinder. The machine can do contour grinding of almost any size and shape."—from facilities booklet of August W. Holmberg & Co., Inc., Flushing, N.Y.



MISSOURI

"Two No. 2 Moore Jig Borers... permit Ehrhardt to locate and bore holes accurately and to inspect the finished work."—from facilities booklet of Ehrhardt Tool and Machine Co., St. Louis, Missouri.

"FACILITIES, FACILITIES, FACILITIES..."

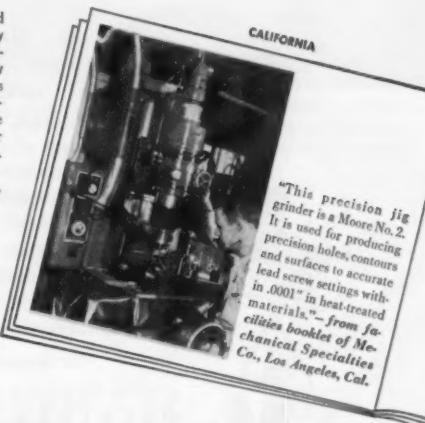
How Leading Tool and Die Shops Across the Nation
Feature MOORE Jig Borers and Jig Grinders

Today, top contract tool and die shops often rely on illustrated booklets to sell prospects on their facilities. And they often rely on pictures of their Moore Jig Borers and Jig Grinders to indicate the degree of precision work they can do. It's particularly significant that leading contract shops choose Moore machines for "double duty"—in the toolroom and on the printed page—for these owner-managed firms are understandably deliberate and judicious in selecting machine tools. Write today for detailed bulletins on Moore's top-billed toolroom teammates.

MOORE SPECIAL TOOL COMPANY, INC.
730 Union Avenue, Bridgeport 7, Connecticut



HOLES, CONTOURS AND SURFACES
Moore's all-new book tells you how to produce tools, dies and precision parts the modern way. 424 pages, 495 illustrations. \$5 in U.S.A., \$6 elsewhere.



CALIFORNIA

"This precision jig grinder is a Moore No. 2. It is used for producing precision holes, contours and surfaces to accurate lead screw settings within .0001" in heat-treated materials."—from facilities booklet of Mechanical Specialties Co., Los Angeles, Cal.

ADD  TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

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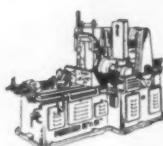
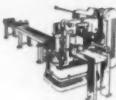
March, 1958

modern machine shop 53

NEW...the only band saw with



automatic feed pressure control



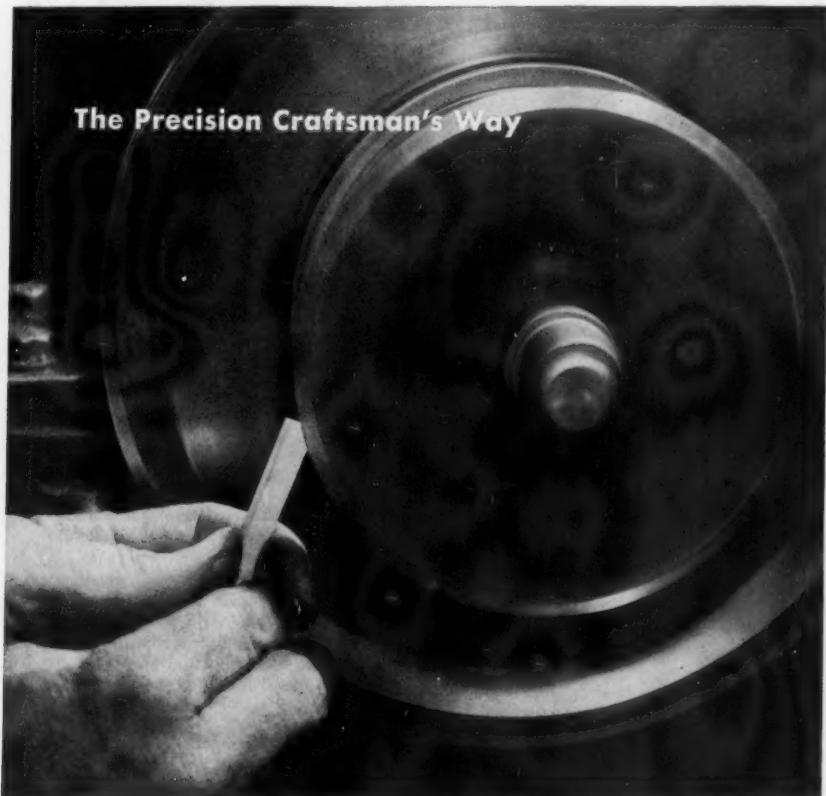
The PEERLESS High Speed Production Band Saw provides industry with an all new metal cutting machine for sawing billets, heavy bars, pipe and structural shapes in a fraction of the time of any cut-off machine of comparable capacity. Compensating feed unit automatically regulates blade pressure at all times, maintains sawing operation at 100% efficiency and eliminates blade breakage. Exclusive counterbalanced saw frame feature protects work, blade and operator. Dual feed single lever control.

For dealer nearest you write—

**P
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**PEERLESS MACHINE COMPANY
RACINE, WISCONSIN**

For more data circle 355 on Postpaid Card



Deburring the edges of a circular pressure slitter knife with a Hard Arkansas Square File. This follows rough sharpening and puts on the keenest final edge.

FREE: Send for the Hand Stoning Handbook —helpful hints on sharpening, radiusing, chamfering, deburring, and fitting delicate parts. And remember: India and Hard Arkansas oilstone files hold their shape longer...and won't dull. In 35 shapes...97 sizes...for every job.

BEHR-MANNING CO.

TROY, N. Y.

A DIVISION OF NORTON COMPANY

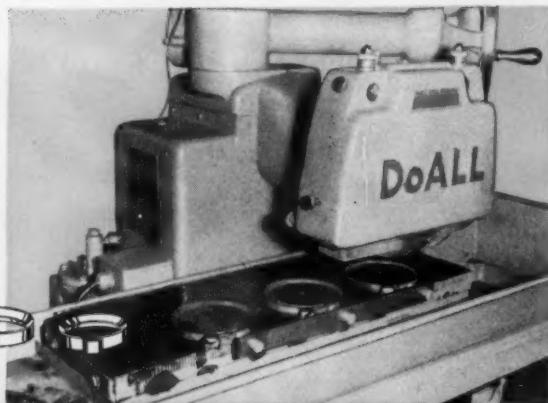


BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

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Can Your Surface Grinder Do This?

Hold .0005"
Accuracy and
.0002" Parallelism
in One pass
over these 3 $\frac{1}{2}$ "
diameter rings



The DoALL GRINDER Does IT EVERY TIME!



Find
Your DoALL Store
In The
'Yellow Pages'

ASK FOR A FREE DEMONSTRATION

—Compare a DoALL with any surface grinder in your shop. See it in operation on a DoALL demonstration unit right in your own plant. Call your local DoALL Store or write.

FREE CATALOG—Shows design and construction of DoALL Grinders, accessories including "Cool Grinding."

Here's another "proof positive" success story for DoALL surface grinders! The Taber Instrument Corporation of North Tonawanda, N. Y., subcontracts the precision surfacing of helicopter rings which have to be held to "tenths."

Forged and heat-treated rings come to the Taber plant slightly warped, where the grinding operation not only has to provide flat parallel plane surfaces for subsequent machining operations but also bring the thickness to the desired finished size. Using an ingenious fixturing device, the operator surface grinds one side using 1/32" cross feed and a .005" deep cut. The other side of the rings are then ground to bring them to final size in one pass holding dimensional accuracy consistently to .0005" and parallelism to within .0002".

The DoALL Company, Des Plaines, Illinois GR-215



Machines and Blades



Surface Grinders



Power Saws

Call Your DoALL Service-Store



SAW BANDS



CUTTING TOOLS



MEASURING INSTRUMENTS



DOALL GRANITE PLATES



SHOP SUPPLIES

IN STOCK

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built-in features assure continuous operation for longer periods!

On job after job—in shop after shop—the reaction is the same: "Procurler heads are producing and lasting far beyond expectations." And no wonder! They're more than just tappers, they're precision instruments, carefully machined, accurately ground, balanced, pre-tested. Rugged, sensitive, they combine advanced features and advantages that mean just one thing—more production for less. Procurler heads give you sustained operation at faster speeds; unparalleled accuracy, fewer broken taps; less spoiled pieces; perfection in produced parts, and less operator fatigue.

Here's why you get EXTRA TAPPING HOURS: heads mount rigidly eliminating chatter and vibration; sensitive friction clutch automatically regulates driving pressure; ball bearings assure smoother, longer lasting "driving"; heat treated gears with special gear reversing mechanism; unique tap holding spindle support PLUS other important features.

Write for FREE Brochure

giving complete details and specifications on the complete line of Procurler Tapping Heads.

PROCUNIER

SAFETY CHUCK COMPANY

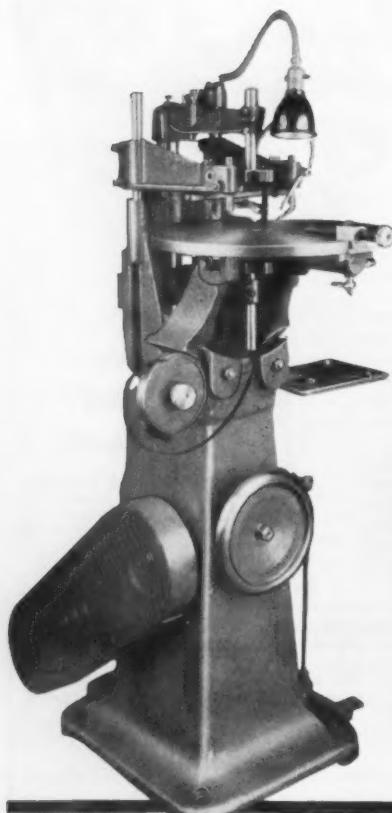
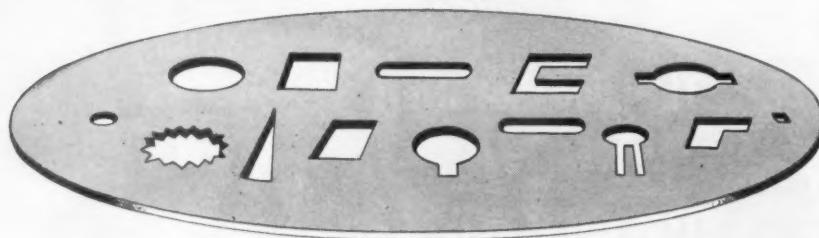
**12 S. CLINTON ST., DEPT. 3
CHICAGO 6, ILL.**

For more data circle 358 on Postpaid Card

March, 1958

modern machine shop 57

FOR CONTOURS LIKE THESE . . .



Freak contours — more conventional shapes — internal or external forms. In any case, you'll save valuable time by producing the job on an Oliver of Adrian contour sawing and filing machine.

Parts for jigs and fixtures, dies, gages, templates and special machine production can be shaped to dimension faster — easier — at less cost. No hand filing or semi-finishing operations. Better investigate Oliver today. Just write. Available in five sizes — bench or pedestal.



OLIVER of ADRIAN
OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

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Cut Honing Costs

with Superior Honing machines. They out-perform all others.

MODEL "VA"

VERTICAL
HONING
MACHINE



MODEL "HM" HONEMASTER

ACHIEVE A BETTER FINISH

than ever before on
most types of metals,
hard or soft.

REALIZE MUCH LONGER STONE LIFE

Superior has just the
right stone for every
operation.

BENCH-TYPE MODEL "JCP"



SHORTEN HONING TIME

Sharpen up your pro-
duction schedule with
Superior Honing
machines.

MODEL "AL" HONING MACHINE

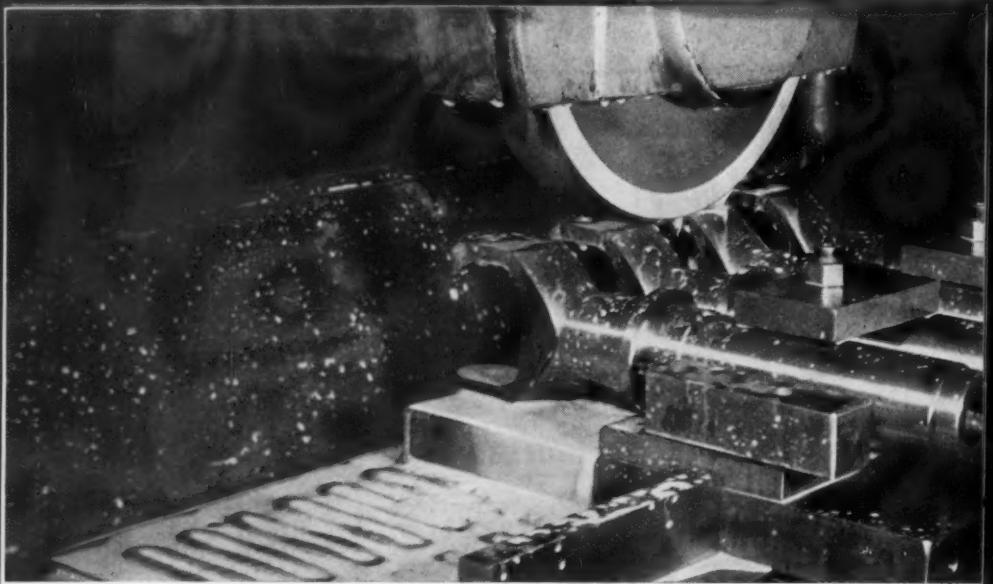


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and prices.

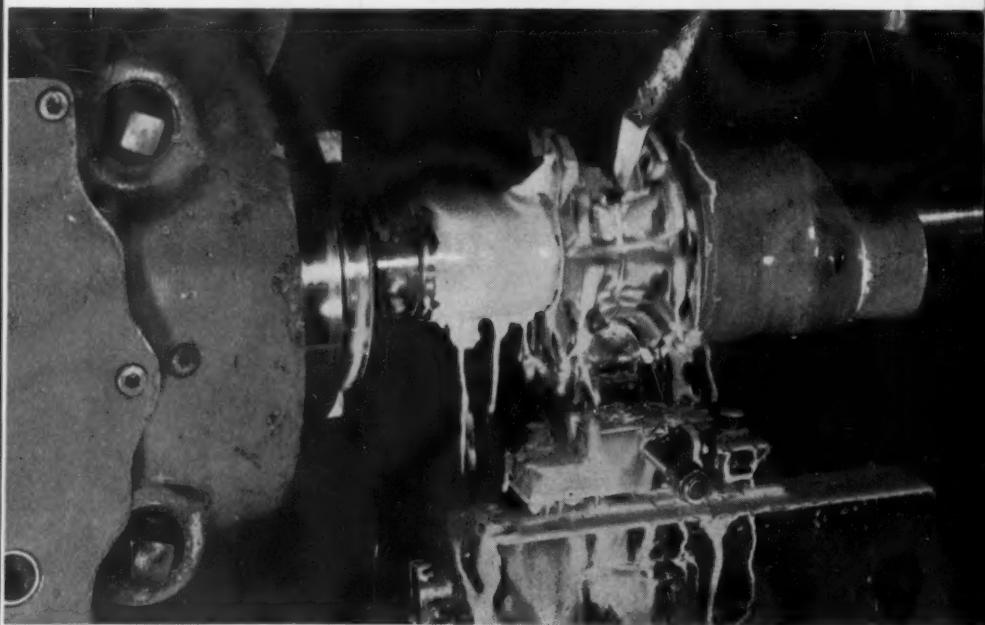
*Superior
Hone Corp.*

1615 Elreno Street
Elkhart, Indiana

For more data circle 360 on Postpaid Card



Wheels and machines stay cleaner with emulsions of new S.E.C.O. Also finishes are better.



Emulsions of new S.E.C.O allow faster cuts with less tool wear.

Photos courtesy of
Peter Salmon Co., Glenside, Pa.

NEW EMULSIFYING OIL KEEPS MACHINES CLEAN, PROTECTS AGAINST RUST, GIVES IMPROVED HARD-WATER EMULSION STABILITY

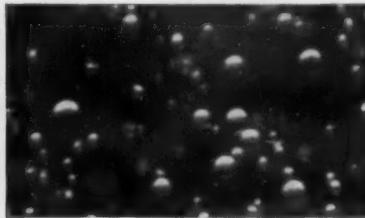
Emulsions of new S.E.C.O. (Sunoco® Emulsifying Cutting Oil) with smaller oil particle size give you the following benefits—

EMULSION STABILITY—In hard-water areas, impartial field tests show that emulsions of *new* S.E.C.O. stand up better under more severe conditions than those made with other regular emulsifying oils.

DETERGENCY—The excellent wetting properties and detergency of *new* S.E.C.O. allow dirt and fines to settle quickly out of emulsions. Grinding wheels and machines stay cleaner.

RUST-PREVENTION—The smaller oil particle size in emulsions of *new* S.E.C.O. gives better metal wetting properties and increased protection against rust and corrosion. See photos below.

If you're a regular user of S.E.C.O., notice how much it has been improved. If you're not, find out what we mean about greater economy and improved production with *new* Sunoco Emulsifying Cutting Oil. Call your Sun representative, or write to Sun Oil Company, Philadelphia 3, Pa., Dept. MM-3.



800x photomicrographs of 10% emulsions. New S.E.C.O. emulsion on left contains 8 times as many oil particles per unit volume as ordinary emulsion on right. Many minute particles in S.E.C.O. emulsion do not show at this magnification.



INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa.

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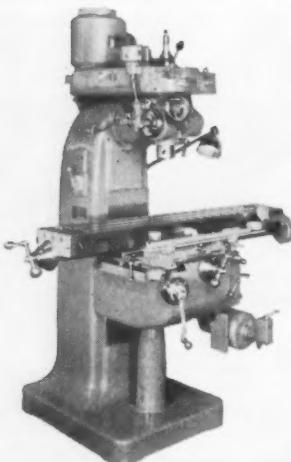
IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

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Produce MORE...
Produce it BETTER!

**ON THESE IMPROVED ECONOMICAL
INDEX VERTICAL MILLS**

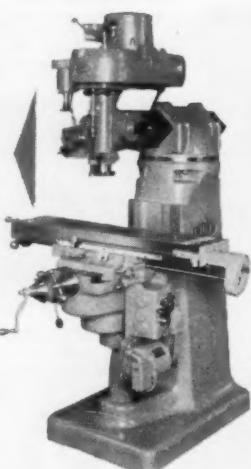
Super
"55" MILL



1½ HP Head or optional 2 HP with continuous duty motor gives 50% or more capacity . . . More rigidity, more accuracy . . . Increased horse power and dynamically balanced Cast Iron Pulleys and Drive System afford improved production capacity . . . More weight in the column, heavier ribbed column, heavier knee, heavier saddle.

Unique square design of overarm affords more rigidity, greater accuracy . . . Provides extra range and capacity . . . More power at the cutter. No adjustment required on overarm and head after use . . . No need to re-indicate head after moving overarm . . . Speed range with nine changes makes possible the use of high speed or carbide tipped cutters to best advantage.

"45" MILL



INDEX MACHINE CO.

544 N. MECHANIC STREET

JACKSON, MICHIGAN

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Norgren AUTOMATIC-DRAIN Air Line Filters



Better Protection for Your Air Equipment

- **Now—30 Models to Choose From**—Transparent and metal bowls— $1\frac{1}{4}''$, $1\frac{1}{2}''$, $1\frac{3}{4}''$, $2\frac{1}{2}''$, $1''$.
- **Removal of Corrosive Liquids is Highly Efficient**—Efficiency has been increased—even at air flows up to 143% higher than most filters available today.
- **Damaging Solids Are Removed**—Choice of interchangeable 74, 64 or 25 micron filter elements.
- **Wide Operating Pressure Range**—Top efficiency at as low as 5 psi. As high as 250 psi for metal bowl type.
- **Wide Operating Temperature Range**—Metal bowl models extend temperature range to 200° F.
- **Will Withstand Rough Usage**—Metal bowl models are ideal for applications likely to get rough usage.
- **Eliminates Cost of Manual Draining**—Collected liquid is drained automatically as long as pressure is on the system.

For complete information, call
your nearby Norgren representative
listed in your telephone
directory—or WRITE FACTORY
FOR NEW No. 900 CATALOG.

C. A. NORGREN CO.

3435 SOUTH ELATI STREET

ENGLEWOOD, COLORADO

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March, 1958

modern machine shop 63

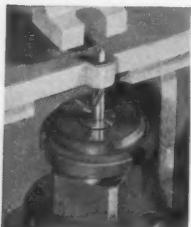
TEMPLATE MAKING



Made Easy



Dimensions are set to .0005-in. with optical scanner. Fine adjustment centers magnified scale graduation between reference marks for accurate locations.



Carbide bushing assures accurate drill orientation.

The WIEDEMANN COÖRDINATÖR takes the high cost out of producing templates, drill jigs, simple fixtures and other precision work in flat sheet metal or plate. Holes are located and drilled to $\pm .002$ -in. with no accumulative error.

In rapid sequence, each hole is located to X and Y dimensions using optical scanners, and drilled from beneath the sheet through a carbide guide bushing.

With the new Wiedemann Coördinatör, accurately drilled work is produced in a fraction of the time normally required. Time consuming manual layout is completely eliminated. Templates are produced on a machine specifically designed for template making—without interfering with work schedules on production equipment.

Write today

for
Bulletin C.

HICKS COÖRDINATÖR DIVISION

WIEDEMANN
MACHINE COMPANY
TURRET PUNCH PRESSES

4219 Wissahickon Ave.

Philadelphia 32, Pa.

For more data circle 365 on Postpaid Card

Money savers for all barrel finishing jobs



Small bench barrels with 7 cu. ft. capacity in production line operation. Alundum Tumblex "T" Abrasive is used for finishing irregular shapes.

A 4 cu. ft. capacity production barrel being unloaded after finishing operation. Thirteen cu. ft. production barrel shown in left background.

For finishing any part... in any barrel, large or small... there's an exactly right type and size of Norton TUMBLEX* abrasive

For lower costs in deburring, de-scaling and finishing parts to close tolerances, be sure to choose:

- *The right barrel equipment, available in a wide range of types and sizes.*
- *The right Norton TUMBLEX abrasive — made in four entirely different types, each in many different sizes and each engineered to add the "Touch of Gold" that brings lustre and boosts profits in finishing the widest variety of parts.*

Send samples of parts you finish — large or small, simple or intricate to our Sample Processing Department. We'll barrel finish, return samples, and tell you exactly the methods and abrasives you need to improve product quality and cut costs.

NORTON COMPANY, General Offices,

Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

G339

NORTON

ABRASIVES

*Making better products...
to make your products better*

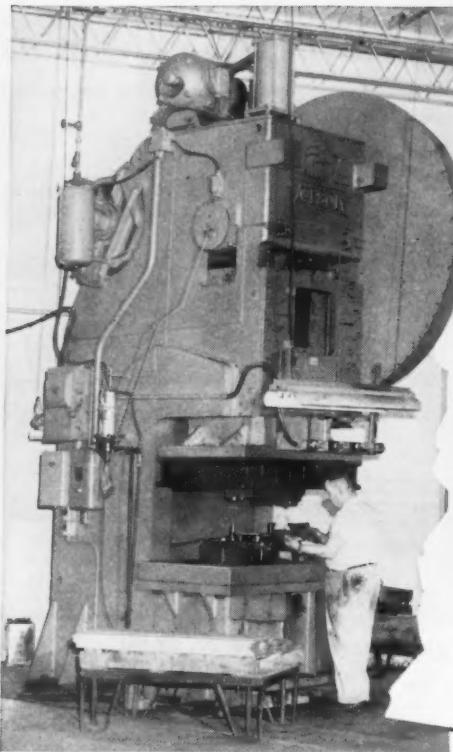
NORTON PRODUCTS

Abrasives • Grinding Wheels • Grinding Machines
Refractories

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

For more data circle 366 on Postpaid Card



A Verson
Press user
reports on
versatility:

"...it would be an almost impossible task to list all of the usages to which our **Verson Gap Press** is being subjected"

General Manager
John Blue Company, Inc.

The above excerpt is from a letter recently received from Mr. W. D. Tucker, General Manager of John Blue Company, Inc., Huntsville, Alabama, a leading manufacturer of farm equipment and contract stamper. Mr. Tucker goes on to say that since the Verson Gap Press is the largest in the plant, it is put into service on practically every application including drawing and forming steel shapes, multiple forming, punching and shearing operations.

The machine is a Verson 10-F Gap Press of 250 ton capacity. It has a 10" stroke with a 5" power adjustment and

A Verson Press for every job from 60 tons up.

operates at 30 strokes per minute. Area of the flanged slide is 34" x 52" . . . the area of the bolster, 36" x 62". The press requires floor space of 135" x 73", is 186" high and weighs approximately 64,000 lbs.

If you'd like further proof of Verson versatility, talk to other Verson Press users. You'll come away realizing that here is more than just a press . . . here is a production process, engineered and built to provide greater efficiency and production . . . higher profit potential. Put Verson's know-how to work for you. Send an outline of your needs.

179

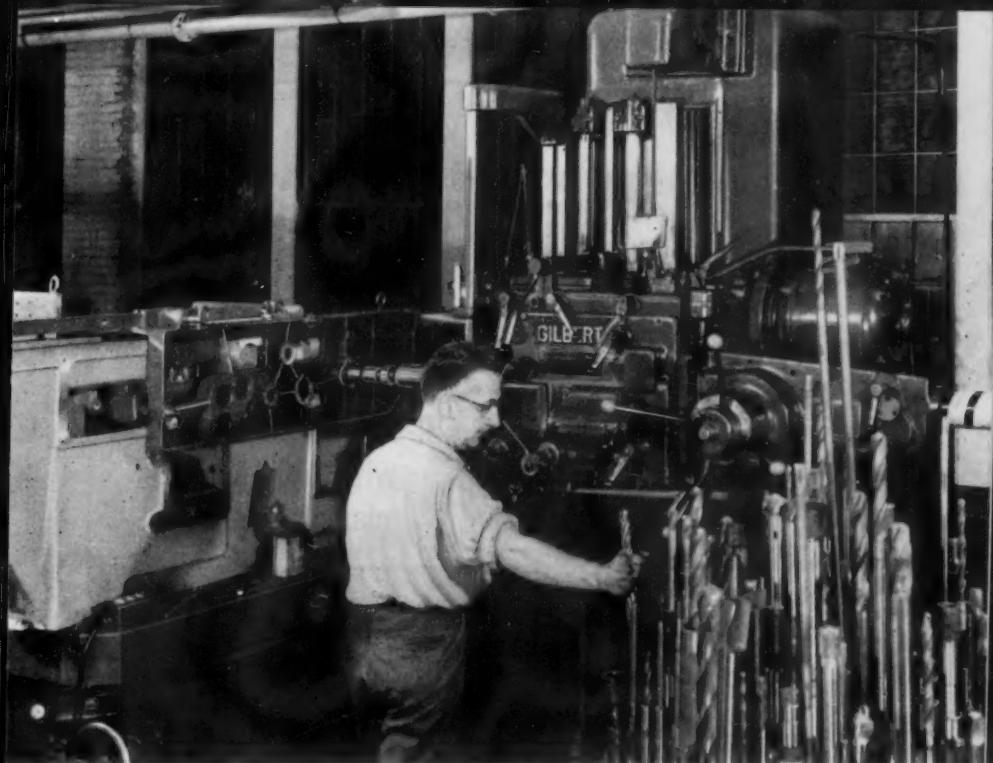
Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois
8300 S. Central Expressway, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES
For more data circle 367 on Postpaid Card



courtesy Brown & Sharpe Mfg. Co.

Brown & Sharpe cuts time 75%

with Gilbert boring mill

"The handling time on this job has been reduced by 75% and the machining time has been reduced by 40%," says T. R. Buckles, Equipment Engineer for Brown & Sharpe Mfg. Co.

These profitable savings were earned by fitting a Cincinnati Gilbert boring mill with a Gilbert revolving table, adjustable on runway, and traveling tool holder designed by Brown & Sharpe.

There are about 180 holes in the workpiece. The boring mill performs drilling, reaming, tapping, or boring

operations as well as some milling cuts. The job was formerly done on a radial drill, portable drill, and floor type miller.

This is another typical example of the time saved (and profits earned) by Cincinnati Gilbert horizontal boring mills. Our man will be glad to show you more examples.

The Cincinnati Gilbert Machine Tool Co., 3348 Beekman Street, Cincinnati 23, Ohio.

Low-cost financing plan—6% simple interest (3% add on), up to 5 years to pay—makes your purchase of Gilbert equipment immediately feasible.

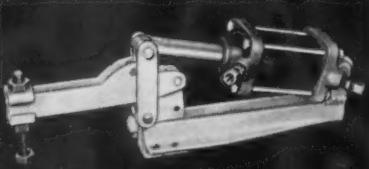
those who buy Gilbert buy **GILBERT** again

For more data circle 368 on Postpaid Card



You asked for it...

KNU-VISE has come up with it!



AO-800 CLAMP

**TWO NEW
AIR-OPERATED CLAMPS
with 800 pound
clamping force**

**AODT-800
DOUBLE TOGGLE CLAMP**



Because you asked for it, Lapeer's vast line of Knu-Vise clamps now features four distinct groups of air-operated clamps. Two new 800 lb. air clamps have been added to the widely accepted 200, 400 and 1200 lb. air clamps, thereby rounding out the Knu-Vise series. The Model AO-800 clamp is for conventional holding operations—the Model AODT-800 for those difficult mounting situations.

For complete information on these units and the more than 150 other models available, write for catalog today!

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE
PRODUCTS**

LAPEER MANUFACTURING CO.

**3048 DAVISON ROAD
LAPEER, MICHIGAN**

WESTERN DIV.: ART LEWIS PRODUCTION EQUIP. CO.
419 Magnolia Street, Glendale, California
CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.
1131 Pettit Road, Burlington, Ontario

For more data circle 369 on Postpaid Card

This is a
knock-out cavity bushing.



It is used in plastic injection
molding.



It is manufactured by *FASTEX*,

Division of Illinois Tool Works, Des Plaines, Illinois.

It has a $7^{\circ}30'$ internal taper.

It is ground from hardened
tool steel, 58-60 Rockwell C

The tolerances must be held to

0.0002"



The grinder on which this bushing
and all its cousins are made is a



RIVETT LATHE & GRINDER, Inc.

Dept. MMR-3, Brighton 35, Boston, Mass.

For more data circle 370 on Postpaid Card



Model 84

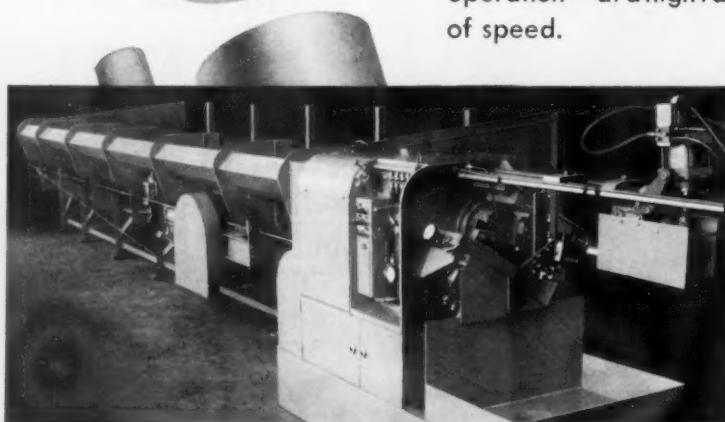
An internal specialist
with external ability.
Mounts interchangeable
wheelheads for
internal and external
spindles. Capacities
are 3" diameters,
depth 4". Collets and
step chucks mount
directly in lathe-type
spindle.



the **Modern** *Way*

Fast CUTTING-OFF of TUBING and BAR STOCK

Automatic operation—from loading to final cut-off. Handles tubing up to 8" O.D. Very fast. With special tools, parts being cut off may be formed, grooved, flanged or chamfered in a single operation—at a high rate of speed.



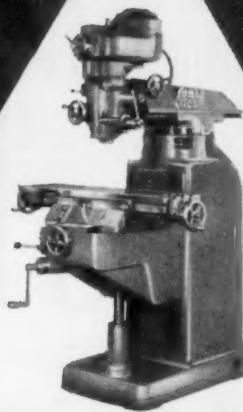
WRITE for CATALOG

New catalog describes all models—gives production figures. Mailed on request.

MODERN MACHINE TOOL CO.

2005 Losey, Jackson, Michigan

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Famco milling machines, either 1 H.P.
or 2 H.P., offer you more power, fin-
est workmanship and greater
range than others anywhere
near their cost bracket.

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alog today!*

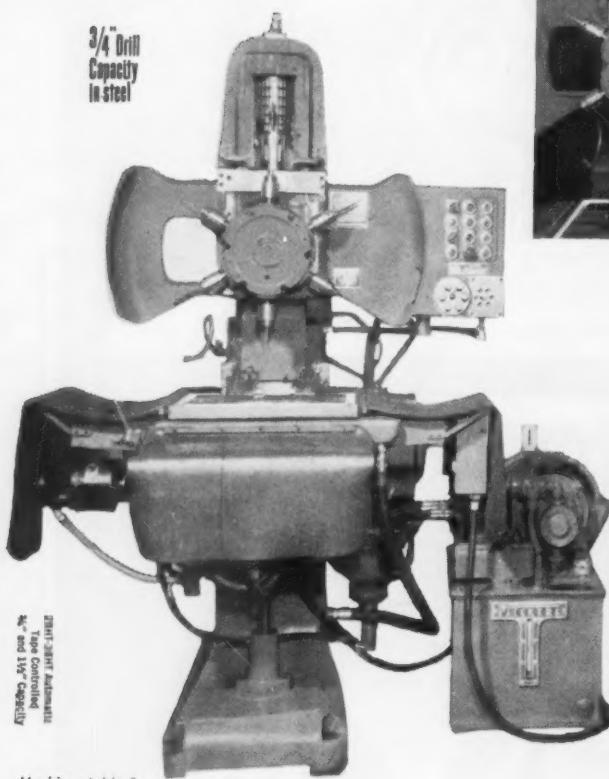
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MACHINE COMPANY
3122 Sheridan Road • Kenosha 3, Wisconsin

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50% Less Machining Time!

Burgmaster Electropoint

3/4" Drill
Capacity
in steel



Alpha-Theta 201 due
December 1968
Delivery late January

Machine, table &
controls complete
\$26,000.00.
30 Day delivery.



Specialists In High Production Turret Drilling



3C Manual
Power Index
9/16" Capacity



2B Manual
Power Index
9/16" Capacity



2BH Automatic
Hydraulic
9/16" Capacity



3BR Automatic
Hydraulic
1 1/2" Capacity



2BHT-3BHT Automatic
Tape Controlled
9/16" and 1 1/2" Capacity



2BHT-3BHT Automatic
Tape Controlled
9/16" and 1 1/2" Capacity

Tape
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15001

FACULT

50% Less Tooling Costs and Lead Time!

Six-Spindle Turret Drill

with Automatic Numerical Controlled Positioning Table

Aircraft instrument gear housings are now precision drilled and bored with 50% less machining time and 50% less tooling cost and lead time on a Burgmaster Electropoint Six-Spindle Turret Drill. Six different operations including center drilling, drilling, reaming, and boring, 5 different diameters, and 12 holes are machined in 3½ minutes floor to floor within $\pm .001$ " location. But this is only part of the story.

1. The Automatic Cycle eliminates fatigue—and produces consistent accuracy with practically no scrap loss.

2. Fixture rework time which averages six weeks can now be handled in five minutes—Just Scotch tape old holes on the control tape and punch in the new data.

3. Only simple holding fixtures are required—eliminating drill and reamer bushings and expensive jig boring time to fabricate—reduces lead time 50%.

4. Tools run at most efficient preselected speeds and feeds—greatly extends tool life and eliminates tool breakage.

5. Quick set-up permits economical machining of small lots—and provides extreme flexibility and versatility.

The Burgmaster Electropoint Control System may be applied to either new 2BHT-6 spindle or 3BHT-8 spindle Turret Drills or machines now in service. The standard hydraulic Burgmaster controls are maintained including pre-selective spindle speeds, infinitely variable pre-selective feeds, selective rapid approach and return, skip indexing, precision depth control, and simple manual controls for set-up. The Electropoint System automatically controls all machine functions, selects spindles in any sequence, automatically positions the table simultaneously on two axes, and clamps it in position while

machining operations are being performed. All operations are carried out at their most efficient rate for high finish, precision, speed, and longest tool life.

Check into Burgmaster Electropoint Tape Controlled Turret Drilling, Tapping, and Boring Machines for your work. They can save you money from prototype to mass production work. There is a Burg direct representative or dealer near you. Call him—he there is no obligation.

JOB FACTS

Machine: Burgmaster Electropoint 2BHT-6 Spindle Turret Drilling, Tapping, and Boring Machine.

Part: Aircraft Instrument Gear Case.

Material: Aluminum alloy

Quantity: 200

Holding: Simple Locating and Clamping Fixture.

Accuracy: Within $\pm .001$ " With-out Bushings.

Accuracy Required: $\pm .0025$ ".

Tools: H.S.S.

Program Part: 1½ Hours.

Punch Tape: 15 Min.

First Set-up Time: 1½ Hours.

Floor to Floor Time: 3½ Min.

Former Method: 6 Spindle Table Type Drill.

Former Time: 7 Min.

Savings: 50% Floor to Floor Time, and Floor Space.

Operations	Diameters	Feed per Min.	Speed RPM
1. Center Drill	.064	.004	1800
.120/.125 x .563 Deep	.064	.004	2000
2. Drill 4 Holes	.005	.005	1300
.183/.179 Thru	.005	.005	1000
3. Drill 4 Holes	.008	.008	1000
.180/.181 Thru	.005	.005	1000
4. Ream 4 Holes	.005	.005	1000
.260/.250 x .164 Deep	.005	.005	1000
5. End Mill 3 Holes	.006	.006	1000
6. Drill 1 Hole	.006	.006	1000



Tape Preparation. Decimal numbers and machining sequences date are punched directly into the tape (requiring no special training, codes, or computers) at an average rate of one minute per command block.

Machine Display. The display shows at all times the actual position of the table to three decimal places and the number of the operation being performed in the machining sequence. The display reads Table Positions +.0000 to -.0005. The system provides "Manual Control," "Semi-Automatic Control," "Automatic Control," or Standard Burgmaster Automatic Hydraulic Control.

Write for bulletin describing Burgmaster and eight spindle Electropoint Tape Controlled Turret Drilling, Tapping, and Boring Machines. Thirty minute 16MM sound film showing all Burgmaster Turret Drills in operation available from any office without charge.

Dept. MM-6

BURG TOOL

MANUFACTURING COMPANY, INC.

15001 South Figueroa Street, Gardena, California
Faculty 1-3510

DAvis 9-4158



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When figuring costs of bending pipe,
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a winning figure every time by using
PEDRICK PRODUCTION BENDERS.

Let us give you a dollar and "sense" answer
to your bending problems.

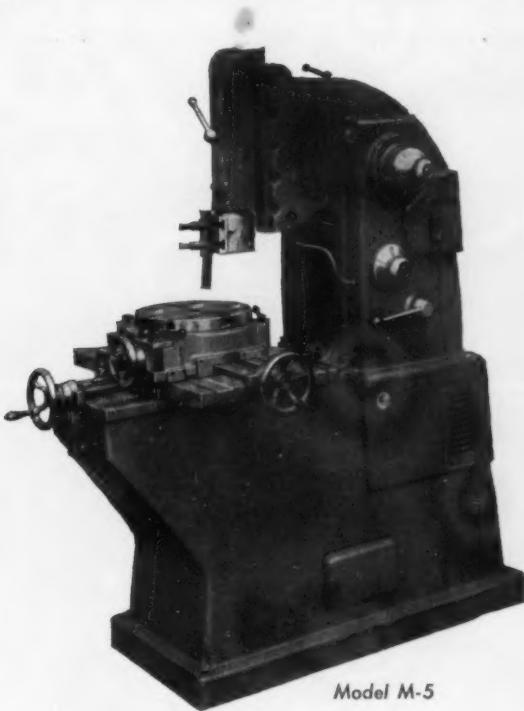
Write PEDRICK TOOL AND MACHINE COMPANY,
3640 N. Lawrence St., Phila. 40, Pa., Dept. 5

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Write today.*

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V
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Model M-5

S H A P E R S 5" and 12" stroke

Designed and built to meet the most exacting U. S. precision engineering standards.

The Chomienne Vertical Shaper with 5" stroke (illustration) is a compact rugged machine, ideal for accurate slotting operation. A "must" to the well equipped die shop. It is a proven time and work-saver on jobs requiring machining of irregular shapes and forms.

Low in initial price, these 5" and 12" Vertical Shapers will repay their investment through savings in time and fixture costs alone. Parts and fast service are available from all major cities. Write for catalogs.



austin industrial corp.

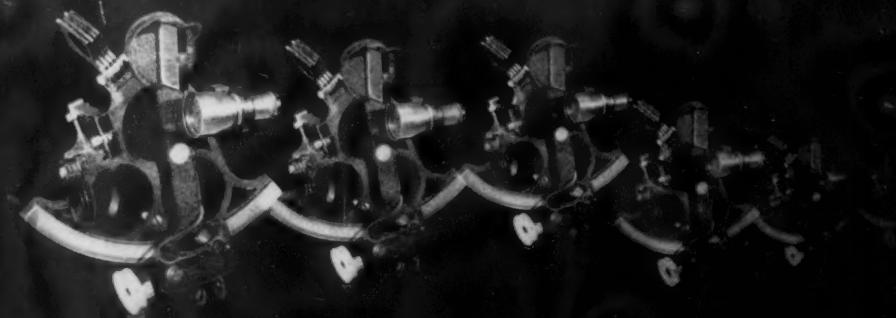
Look for the Austin Seal — your full guarantee of satisfaction.

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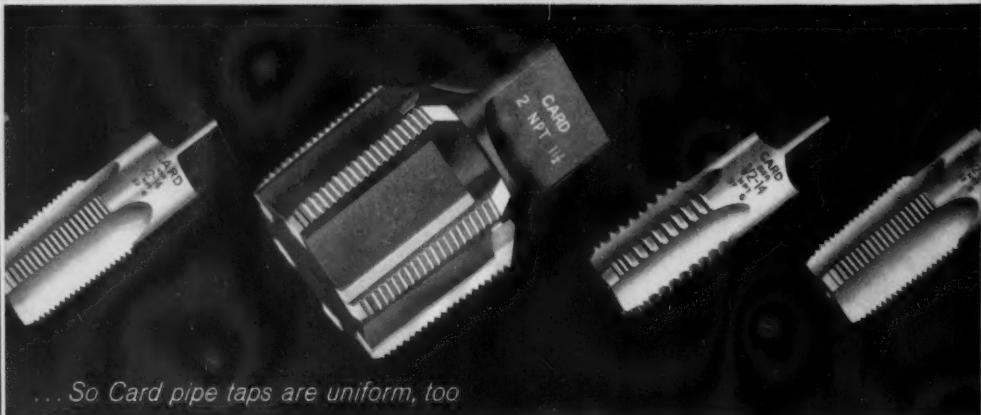
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SA155-24



As these sextants are uniform



... So Card pipe taps are uniform, too

*Your production's consistent
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This brand cuts down your carbide
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Wherever your production calls for cutting with carbide tools, use Union carbide tools. They perform better . . . last longer . . . lower your costs per piece produced. Union also manufactures drills, milling cutters, gear cutters, end mills, reamers, hobs and inserted blade cutters. Available nationally through **Union Distributors** and stocked in Union warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City and San Francisco.



UNION

TWIST DRILL COMPANY, Athol, Massachusetts
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See Your **UNION DISTRIBUTOR** for cutting tools that will save you time and money
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variable speeds 60 to 3300 r.p.m.

**TREE 2UVR
VERTICAL MILL**

Spindle speeds infinitely variable from 60 to 3300 r.p.m. make the 2UVR Vertical Mill useful for a wide range of work not heretofore accomplished by mills of this size. Exclusive features include:

- Roller Spindle Drive
- Automatic Collet Closer
- Head to Ram Mounting
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TREE TOOL & DIE WORKS
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Tablet for

TIME-SAVINGS IN METAL WORKING



Right In Your Pocket!

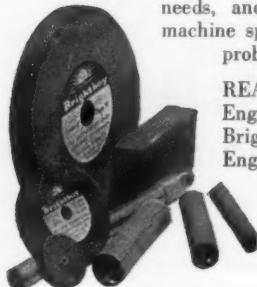
For fast finishing, metal working men are keen on the convenience of this Brightboy tablet. They carry it in their pockets . . . keep it handy on benches and machines. Reason: The unique working action of abrasive-plus-rubber Brightboy is a revelation for quick cleaning; burring and smoothing rough edges and surfaces; removing weld marks and tool digs. *On all metals.*

A Completely New Slant on Abrasive Applications!

Multi-use Brightboy wheels, sticks, rods and blocks for machine and manual operations achieve substantial time savings, perform operations never before associated with abrasive finishing. STOCK Brightboy numbers, job-matched to your requirements, do the work of "specials" and usual finishing too. Silicon Carbide and Aluminum Oxide grains. Each in grades from extra fine to extra coarse. Each in soft, firm, and tough rubber binders.

Ask your dealer to recommend the Brightboy numbers for your needs, and for the Brightboy Catalog listing applications, machine speeds. Write us if he cannot supply you, or on any problem in which finishing is involved.

READY NOW! "Notes From The Brightboy Service Engineer." An informal news letter describing various Brightboy applications reported by Brightboy Service Engineers. WRITE FOR YOUR COPY or ask your dealer.



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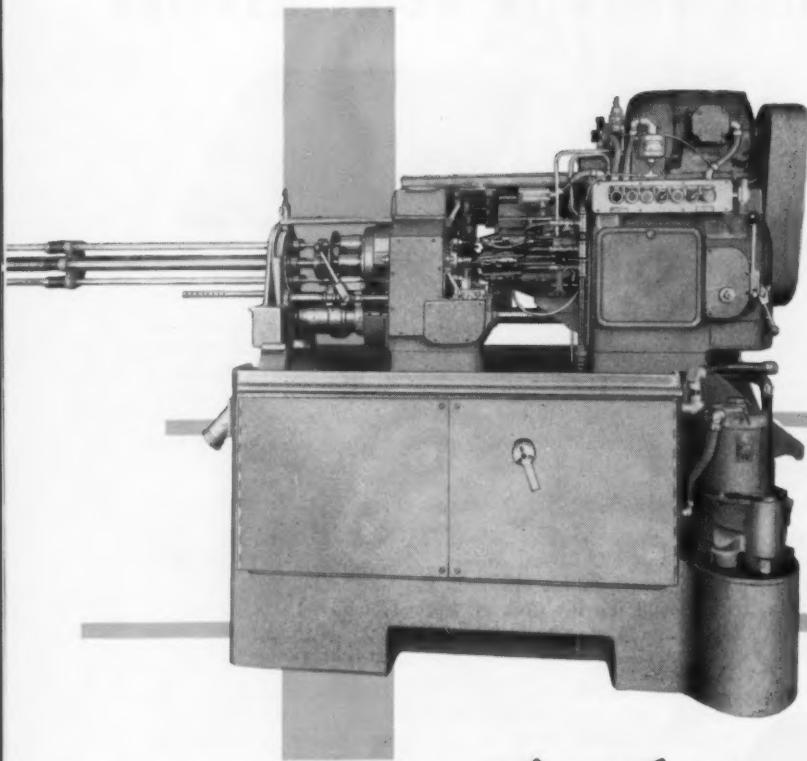
America's Pioneer Manufacturer
of Rubber-Bonded Abrasives

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March, 1958



NAMCO standard Quick-Change tooling available on



this all-new *Acme-Gridley*
**7/16"-Six Spindle Bar Automatic gives
you the lowest cost per piece.**

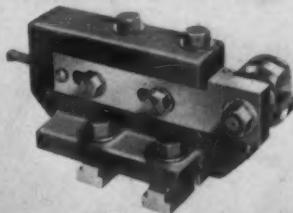
HIGH PRODUCTION ACCURACY—sustained at highest speeds and feeds through proper weight distribution and support of toolholders without overhang.

WIDE TOOLING VERSATILITY—through independently operated cross slides, spindle stopping (optional) and a variety of standard and special attachments.

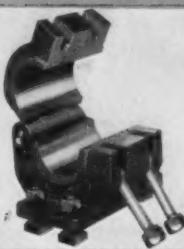
LONG OPERATING DEPENDABILITY—extra-reverse power, strength for top performance with *all* tools.

... . . . the new **$\frac{7}{16}$ " Six as on all** *Acme Gridley*
machines—supplied as standard
equipment—at standard tooling prices.

Production efficiency is measured by the total cost of the job run. The "quick-change" tooling of Acme-Gridleys, in addition to their other outstanding high output characteristics, assure low costs on all production runs. Illustrated here are three of the many "quick-change" toolholders available for all size Acme-Gridleys, which require only the simplest of gauging on the machine when setting up or resharpening.



This "quick-change" toolholder permits the circular tool and block to be removed for tool sharpening.



Hinged type toolholder allows quick-change side removal of drill bushings, counterbores and shank type toolholders by simply loosening two clamp bolts.



Only two bolts need be loosened to release the tool for sharpening in this Dovetail Toolholder. A simple straight edge can be used to accurately align the tool when it is replaced.

Find out more about "quick-change" tooling as engineered into Acme-Gridleys
for lower total production costs.

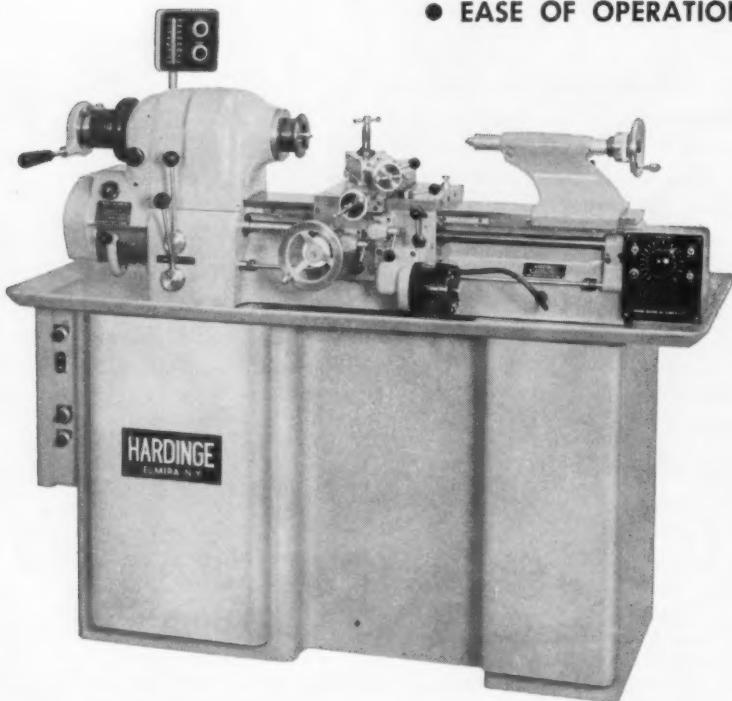
National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131st STREET, CLEVELAND 8, OHIO
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ELMIRA, N.Y.

"Outstanding Tool Room Lathe"

- EXTREME ACCURACY
- HIGH SPINDLE SPEEDS
- EASE OF OPERATION



**Model HLV
TOOL ROOM LATHE**

Write for Bulletin HLV

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OFFICES IN PRINCIPAL CITIES. Export Office: 269 Lafayette St., New York 12, New York
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Most Drilling Per Dollar!



See it in action at
ASTE SHOW, Booth 1356—
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RADIAL

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Features Found Only In Highest Priced Radials

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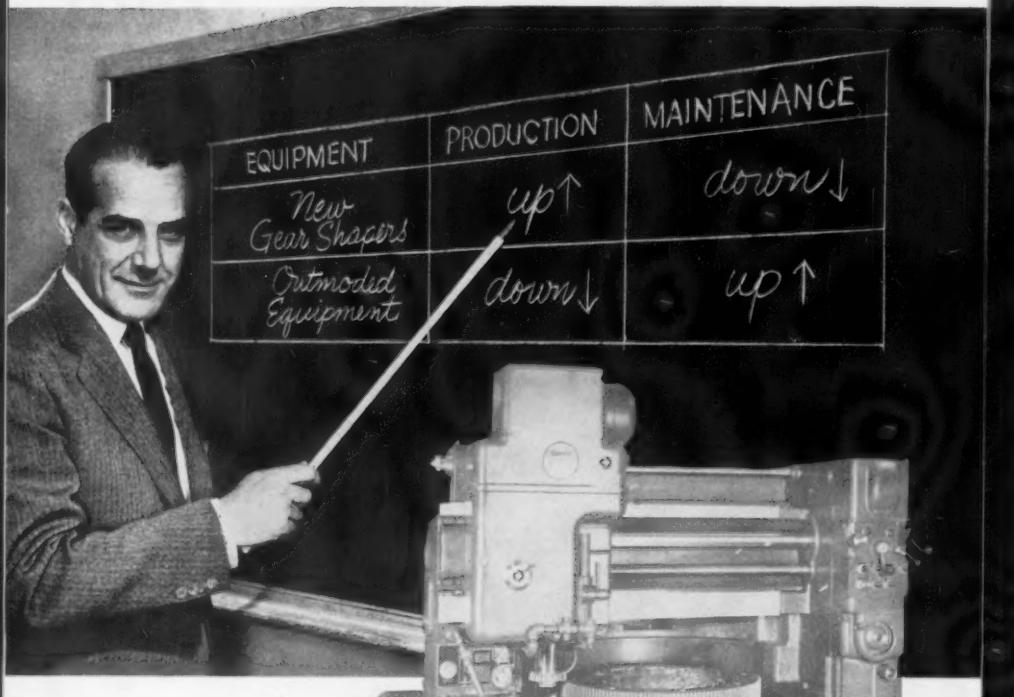
Refer to Sweet's Machine Tool File (IA/VE) for our catalog.

Send for Brochure of Veet's 16 Points of superiority and name of nearest dealer, who will arrange actual demonstration of the Veet Radial in your plant, without obligation.

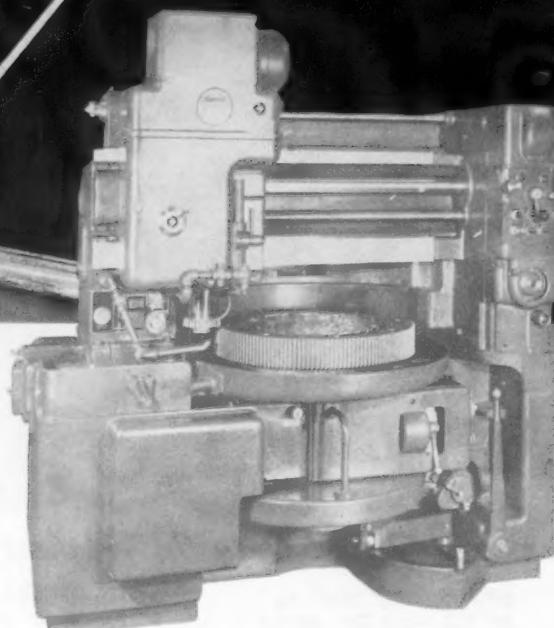
MFGD. BY **Veet INDUSTRIES** EAST DETROIT, MICH.

Tel. PRescott
6 - 3 0 0 0

Modernize FOR



Productivity: A 22.250" P.D., 4 D.P. steel gear is cut in 2½ hours on a modern Fellows 36-Type Gear Shaper. Older machine required ten hours.



THE
PRECISION
LINE

LOWER COSTS

with new FELLOWS 36-TYPE Gear Shapers

Two new Fellows 36-Type Gear Shapers can produce more than three or four older machines...and give you extra production versatility, too. In many plants, new Fellows production equipment has lowered unit production costs by more than half, earned back its cost in three years or less.

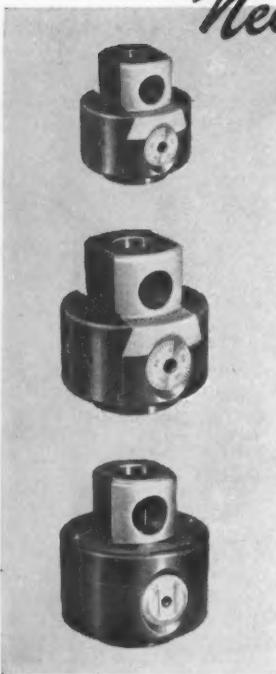
Fast, accurate, and simple to set up for a wide range of jobs up to 36" P.D., the Fellows 36-Type is ideal for short runs of varied parts as well as for long runs. Rigid, husky construction permits close tolerances on internal or external spurs, helicals, and herringbones, as well as an almost unlimited variety of cams, splines, and other non-involute shapes. Cutter speeds range from 18 to 300 strokes per minute.

Why not ask a Fellows Representative to *show* you in your plant where you can cut production costs with newer machines? Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 1048 North Woodward Ave., Royal Oak, Michigan
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6214 West Manchester Ave., Los Angeles 45

Fellows Gear Production Equipment

New from Criterion!



3 NEW BORING HEADS WITH THESE OUTSTANDING FEATURES

Round-body design
Cross-hole for greater range
Short - compact construction
Sizes — #102 has 2" diameter
#103 has 3" diameter
Boring range — 1/16" to 8" and larger

NEW 3" DIAMETER MODEL #203 INCLUDES THESE ADDITIONAL FEATURES

Protective cap houses all moving parts
Friction lock dial face permits return
to zero setting.

THESE NEW HEADS TAKE 1/2" or 3/4" SHANK BORING TOOLS AND BORING BARS

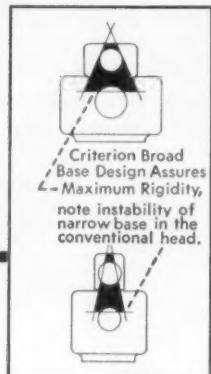
RUST-RESISTING BLACK AND SATIN-CRUIHE FINISH

Offset range — 1/2" in 2" dia. model
3/4" in 3" dia. model
Complete line of high-speed and carbide
boring tools to fit all Criterion Heads
carried in stock.



CRITERION BORING HEADS are better because they
combine utility with simplicity of design — see
sketch to the right for one of many features.

CRITERION
MACHINE WORKS
756 WEST SIXTEENTH STREET
COSTA MESA, CALIF.



Consult your Criterion Dealer or write for free literature.
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FINE PATTERN on 11" diameter "plunger" forms molding surface for press to make abrasive wheels. The Carborundum Company.

Airkool-S retains precise size and shape through heat treatment

Forming this precise pattern is easily accomplished with Airkool-S, a tough, sulphur-bearing, air-hardening tool and die steel with good machinability. Its excellent nondeforming properties are important too, because this pattern must be retained, without distortion, through heat treatment.

Because Crucible Airkool-S is consistently uniform and clean, no objectionable irregularities appear on this fine pattern. Further-

more, Airkool-S is much more abrasion resistant than typical oil-hardening tool steels, and is substantially tougher than high-carbon, high-chromium types.

Stocks of Airkool-S and dozens of other special tool steels are maintained in all Crucible warehouses—in a wide range of sizes. *Crucible Steel Company of America, Dept. TC11, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE STEEL COMPANY OF AMERICA

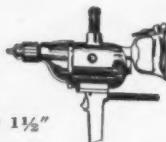
Canadian Distributor—Railway & Power Engineering Corp., Ltd.

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GENERAL PURPOSE



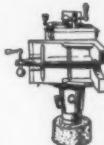
1/4" TO 1 1/2"



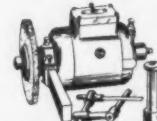
United States Electrical Tools



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Electrically and mechanically correct. All rotating parts and spindles are precision-balanced dynamically by latest electronic equipment.

Performance — plus remarkable savings in time and costs — as well as minimum maintenance — these are features to assure your satisfaction. Precision-engineered and crafted for maximum endurance under exacting conditions . . . tools to speed production or for plant purposes.

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Model PS — 34/61

SLIDING BED GAP LATHE

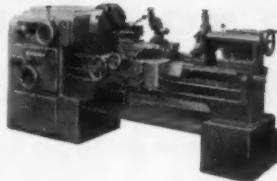
Swing over ways 34";

Swing in gap 61";

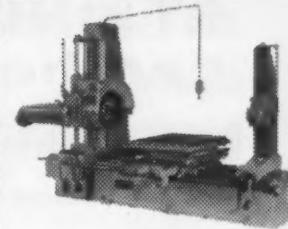
Flame Hardened and

Ground Bed Ways

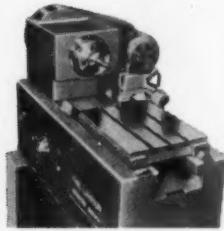
\$12,990



SCHAERER LATHES



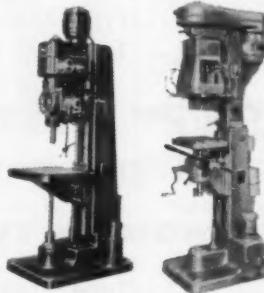
**IMPERIAL HORIZONTAL, BORING,
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FROM \$9,988 TO \$47,880



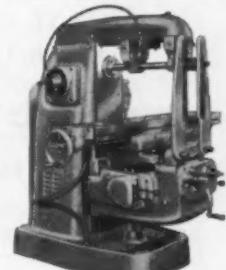
LARSON

Fine Precision Boring Machine
(Hydraulic Feed)

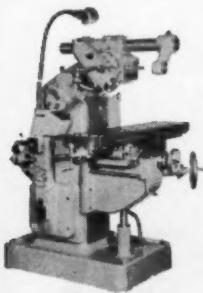
\$2,495



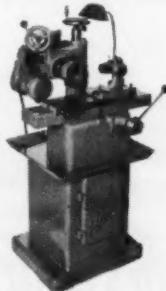
IMPERIAL DRILLING MACHINES



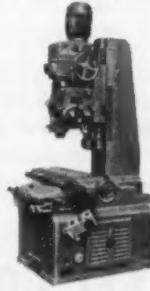
WESTBURY
UNIVERSAL DIAL-TYPE
HORIZONTAL
MILLING MACHINES
FROM \$3,390 TO \$5,980



ABENE
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MILLING MACHINES
\$3,990



HAAS
UNIVERSAL TOOL &
CUTTER GRINDER
\$1,195



IMPERIAL
OPTICAL JIG BORER



WESTBURY 15
VERTICAL TURRET
MILLING MACHINE
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OVER THE EDITOR'S DESK . . .



QUEST FOR MORE

During this month, and in the next few months to come, a great deal of controversy will revolve around various demands for increased wages, fringe benefits, shorter work week, profit sharing and the like. Anticipating the possible demands on industrial manufacturing plants, a chairman of the board of one large auto plant recently made this observation. He said that years ago, true liberals sided with working people against the indifference to human needs and the social irresponsibility of old-time owners of businesses. Public opinion brought about a correction of many of those abuses. Today those same forces cannot help but see, in the growing union monopoly power, a new threat to our most cherished freedoms.

Many business enterprises have discovered that giant labor unions, with unprecedented monopoly power, have pushed through larger and larger wage and so-called fringe benefit packages to a point where increased wage costs far outstrip the increase in productivity. When those so-called fringes amount to some 20 percent of the total wage

package, they can hardly be regarded as mere trimmings or decorations. The total result of the greater demands has been a steady squeeze on corporate profits and constantly increasing prices for goods and services.

As prices rise, consumers rebel or stop buying, or profits dry up and business firms begin to collapse. The results are stagnation and unemployment. It is unfortunate that some labor leaders hold up profits as something intrinsically suspect and presume to sit in judgment on the morality of industry in its pursuit of profits. In the analysis of cold facts, blaming a company for making good profits is like blaming a cow for giving too much milk.

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AS USUAL, TIME AND MONEY

Also in the months ahead, U. S. missile development will have all the priority it can use. Estimates that this country is as much as two to three years behind the Russians in development of intercontinental missiles have been offset lately by more optimistic appraisals. Some middle-of-the-road experts now say

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OVER THE EDITOR'S DESK . . .



the U. S. is only a few months behind at worst. The U. S. lag is considered greater in development of intermediate range missiles, since the Russians are known to have fired hundreds of missiles with range up to 1,000 miles, and possibly have perfected missiles able to hit targets 1,800 miles from the launching site.

In the matter of launching satellites, the Army put our first space vehicle into orbit with an initial thrust of 75,000 pounds, whereas the Russians are believed to have put 200,000 to 265,000 pounds of thrust behind Sputnik I, and may have used 500,000 pounds of thrust behind Sputnik II. In the field of developing such super-powerful rocket engines, the U. S. now is seeking to close the gap. A Senate preparedness subcommittee, recently called for work to start at once on an engine with one million pounds thrust. Most of the experts say that packing that much power into the first stage of a rocket involves no unsolved design problems but will take time—and money.

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NIOBIUM

Niobium now can be refined to usable purity, according to a Du Pont report, and so becomes one of the metallurgist's latest hopes in solving design problems calling for

high strength at high temperatures. Since Niobium, also called Columbium, now can be made in alloy form, it is expected to play an important role in the building of guided missiles, atomic reactors and jet engines.

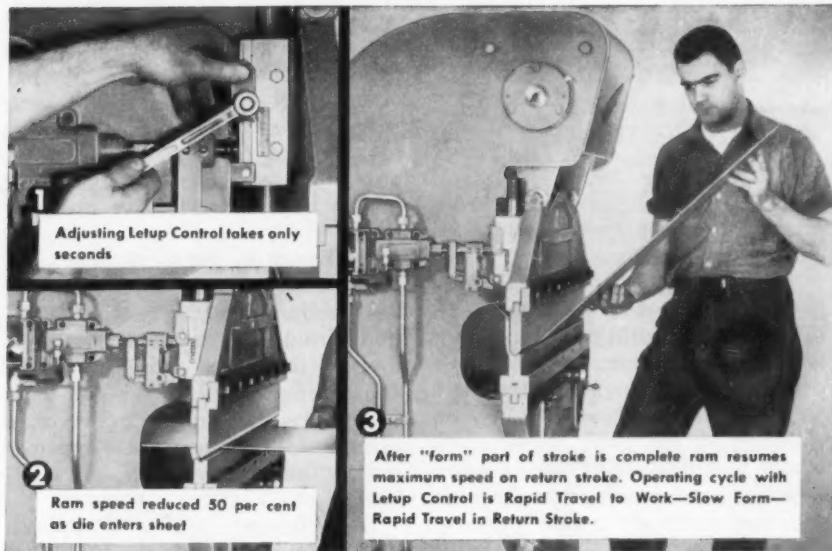
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THERE WHEN NEEDED

Speaking recently on production in the long-range future, Andrew A. Kucher, vice president of engineering and research at Ford Motor Company mentioned that he could not foresee a push-button utopia where machines will do all our work. For the most part, the infinite variety of tasks to be performed in the world today can be accomplished only through that unique human correlation of an elaborate brain, with great manual dexterity.

During the first half of this century, the use of unskilled workers has been reduced from 36 to less than 20 percent, whereas the use of semi-skilled workers has increased from 15 to almost 23 percent. In this same period, the percentage of professionally trained workers has doubled and science degrees have increased at a far greater rate than the rise in population.

Up grading of worker skills will be essential for the more technical complex future processes. In the future, scientists will learn much more about the structure of matter and will be able to engineer materials from common elements to suit their needs. The design engineer will become more familiar with the complexities of mechanized produc-



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tion, and process engineering and will be better able to develop products that can be manufactured by advanced techniques.

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BUDGET IMPACT

The probable impact of the proposed budget on the economy is hard to evaluate. There are so many imponderables. In addition to the size of the budget itself, what happens will depend upon time lags in the spending program, the speed of various reactions of the private economy to government fiscal operations, the non-budgetary cash flows between the government and the public, how the budget affects private expectations and many other factors.

As a measure of the impact of the fiscal policy on the economy, a consolidated estimate of total cash payments from and to the public, including trust fund (e.g. social security and the highway program)

and other transactions, is more important than the budget accounts proper. Based on the following estimates of these cash flows as projected for fiscal year 1959 and for the remainder of the current fiscal year, it is possible to make some preliminary and tentative observations:

1) The proposed fiscal plan calls for an increase in cash payments to the public of approximately \$2 billion—from an estimated \$84.9 billion in the current fiscal year to \$86.7 in fiscal 1959.

2) Receipts from the public, it is estimated, will increase by approximately the same amount—\$85.1 billion to \$87.3 billion.

3) A budget surplus of approximately \$0.5 billion for 1959 is projected.

4) Between now and July 1, 1958, supplemental appropriations are anticipated and actual spending (payments to the public) is now expected to be \$2.1 billion higher for the current fiscal year than was anticipated last October in the Mid-year Budget Review. In fact, while total receipts and payments, including trust fund and other transactions, are expected to roughly balance, the administration now expects to close this fiscal year with a \$400 million deficit in the budget proper.

The budget appears to be predicated on a high-employment economy. It reflects the optimism of the President's State of the Union Message when he said: "There are solid grounds for believing that economic growth will be resumed without extended interruption." According to the revenue estimates, current tax



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rates are expected to yield about \$2 billion more revenue—almost \$1 billion more from the personal income tax, and the rest from other sources. The corporate income tax is expected to yield about \$20.4 billion—the same as forecast for 1958.

The budget appears to be mildly stimulative and to strike a good balance between the unknown deflationary or possibly inflationary course of events ahead. If recession continues, increased spending on military orders during the first half of 1958 and planned outlays for 1959 will help to buoy up flagging private demand. Even the prospect of such increases may have a favorable effect on business expectations. If there is a rapid recovery in the second half of 1958 and inflationary pressures again become dominant, rising incomes and tax revenues should produce a budget surplus substantially larger than the one projected now. This would be good antiflationary medicine.

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WHAT NEXT DEPARTMENT

An automatic currency changer that will return two quarters, three dimes and four nickels for a dollar bill, all in three seconds, has been invented by William A. Patzer, president of A. B. T. Manufacturing Corp., Chicago. The "Bill Changer" will take creased, torn,

rumpled, dirty singles but will reject foreign and fake money. Modified, it would even change \$2, \$5 and \$10 bills.

Drawings for the blind are now a practical possibility with the development, by Harry P. Sewell, Forest Hills, N. Y., of a simple drawing kit in which an inkless ball-point pen is used to trace indentations on a sheet of Mylar plastic clamped to a rubber-surfaced lapboard. Maps, geometrical problems, circuits, diagrams and graphs, among others, can be sketched.

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LESSON FROM RUSSIA

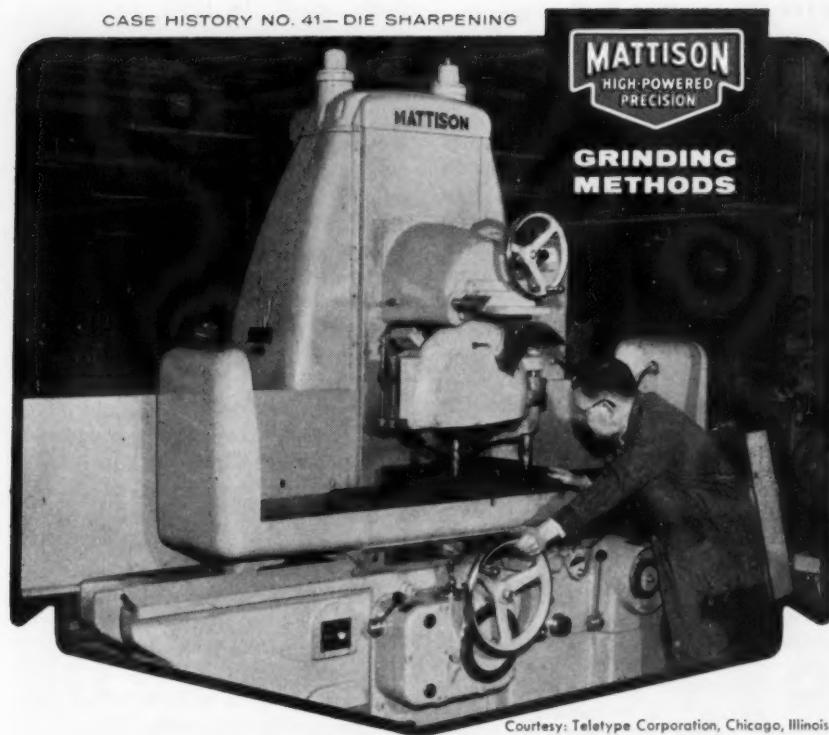
Ironic as it seems, it may be that the communists can teach capitalist America something about the "profit motive" after all, according to the Chamber of Commerce of the United States.

With the outpouring of news about Russia, many Americans, says the Chamber, have been surprised to learn that Soviet teachers, scientists, intellectuals, industrialists—the talented, creative persons—receive rich economic rewards.

Hard-headed as the communists are, they have never been so deceived by Marxist doctrine as to let it dictate their actual economic system. They understand what makes Sammy run. They move in the direction of offering more reward for greater merit.

Meanwhile, by way of our federal income tax system, with rates ranging up to 91 per cent on incomes of \$200,000 and up, we move in the other direction, says the Chamber.

CASE HISTORY NO. 41—DIE SHARPENING



Courtesy: Teletype Corporation, Chicago, Illinois

**Single setup sharpening of large dies
cuts toolroom costs, reduces downtime**

Here's how valuable production time can be saved by sharpening large dies on the Mattison High-Powered Precision Surface Grinder. In the Wrightwood plant of the Teletype Corp., Chicago, Ill., entire dies that were once sharpened section by section are now ground intact on this high-powered Mattison grinder... a reduction in setup time of up to 83 per cent. The wheel and spindle clearance of these Mattison machines makes it possible to sharpen the entire die without disturbing the lead pins. This means the die can go back to the press directly from the grinder, reducing press downtime.

Your Mattison dealer can arrange for a test grind of your toolroom or production parts in the Mattison Methods Laboratory... see him for full details.



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Large blanking die is sharpened intact
...note undisturbed lead pins. Stock re-
moval, .005 in.; burr allowance, .002 in.

OVER THE EDITOR'S DESK . . .



The main drive of U. S. taxes, with their increasing penalties upon success, is away from individual achievement and toward social leveling.

Perhaps it is we who have been deceived, the Chamber suggests. For it is we who have tried to level economic differences by steep and unjust tax rates which penalize the talented, creative citizen.

It should not take the Russians to teach us the value of giving the highest rewards to the best producers, the Chamber concludes.

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INDUSTRIAL RADIOISOTOPES

The evidence is now quite clear that industry is becoming increasingly aware of the potential gains—both in cost savings and improved quality—resulting from industrial applications of radioisotopes. Industrial users of radioisotopes—defined as chemical products produced in a nuclear reactor and, therefore, capable of giving off radiation—increased from 18 in 1946 to 1,667 in 1956. This increase is the result of: (1) cost savings possible from known applications; and (2) increased production facilities for artificial radioisotopes, particularly cobalt-60. Small business as well as big business is using this new tool safely and economically to increase the quality of its products while re-

ducing costs. In brief, radioactive isotopes are and will be employed by industry because they do a job that could not be done before, do a better job, or perform a job more economically.

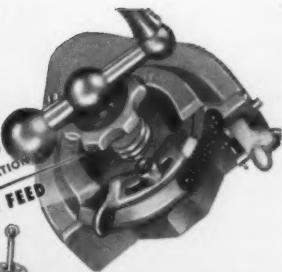
Industrial uses of radioisotopes already cover a wide variety of applications and an apparently unlimited number of applications still remain to be discovered or made commercially available. Generally the current uses include: (1) industrial research—irradiated tools or parts to measure the wear of such items as cutting tools, pistons, or wire drawing dies; (2) radiography—a substitute for X-rays in inspection of steel castings or welded joints; (3) gaging—gages to measure and control the thickness of steel, paper, paint, rubber, and other products; (4) tracers—to follow the flow of oil in a pipeline, the transfer of printing ink, or to determine the completeness of mixing of paint; (5) ionizers—as a static electricity eliminator in the production of textiles, paper, or other products where friction is a troublesome factor; (6) polymerizer—a catalyst to speed or initiate chemical reactions; and (7) radiator—low intensity light source for exit signs, storage bins, or traffic lane markers.

More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 340.

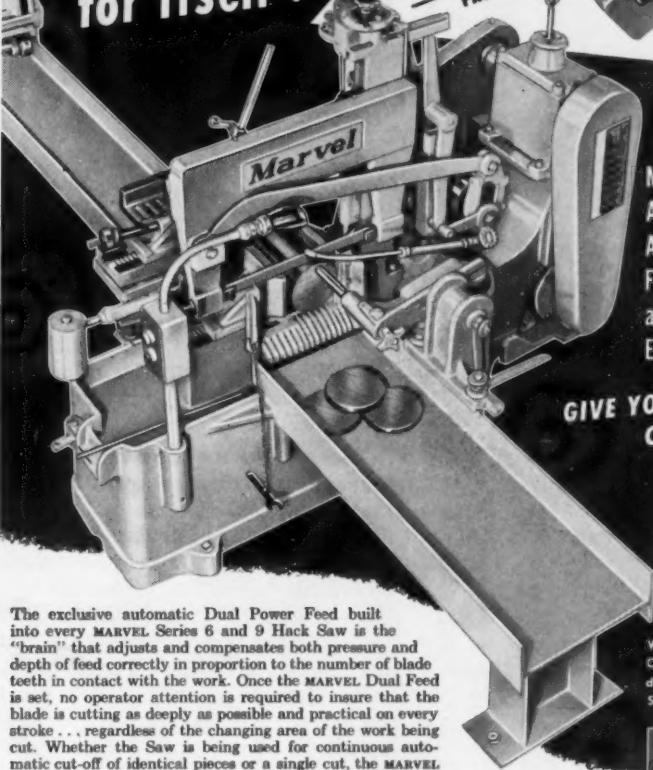
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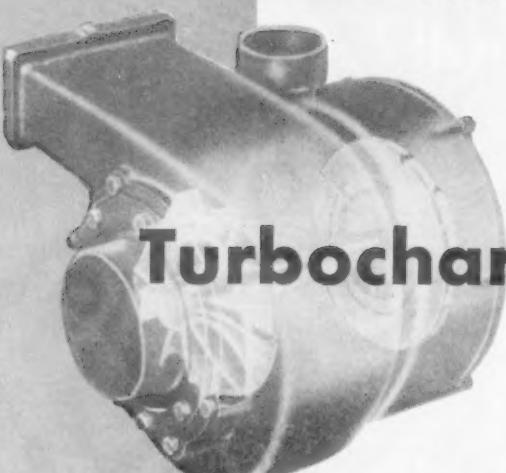
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Production Machining Parts For **Turbochargers**



By FRED W. VOGEL
Editor, Modern Machine Shop

A description of the more interesting operations involved in producing turbochargers for the Cummins "Turbodiesel" Engine.

Today, when conversation turns into a discussion of modern motor cars and trucks and particularly to methods of carburetion it is not at all uncommon to hear such technical terms as "four-barrel," "supercharger," "turbocharger," or the like, and it is suddenly realized that many of the terms used today were unheard of just a few short years ago. Turbocharger, for example, is a term as well as a device that is destined for greater and more widespread usage. As a device, it has found widespread acceptance in Diesel engine manufacture as an essential power boosting accessory. Basically, it is an air pump designed to blow a larger quantity of air into the cylinders

of an internal combustion engine than would be introduced into the combustion chamber without a pump.

The turbocharger, as designed and built by Cummins Engine Company, consists of a double chamber, one section of which contains a turbine wheel and the other an air impeller wheel, with both wheels mounted on a common shaft. In use, hot diesel engine exhaust gases from the cylinders flow through the exhaust manifold and into the turbine chamber of the turbocharger. In the turbine chamber, the exhaust gases expand and release energy to drive the turbine wheel.

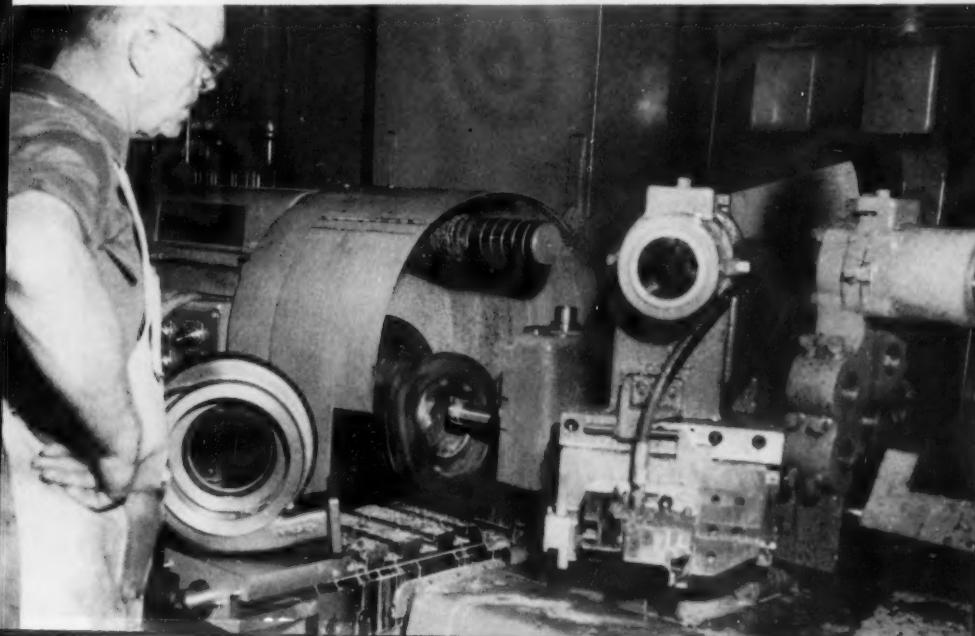
As the turbine wheel rotates, the air impeller being mounted on the same shaft rotates within the air chamber. This action aided by the specially designed vanes of the air impeller draws in outside air, com-

presses it, and forces it into the intake manifold. The high air pressure being forced into the cylinder mixes with the fuel and causes it to be burned more completely and thus makes possible the development of additional flywheel horsepower for the diesel engine.

The turbocharger is essentially a simple mechanism and one which plays a most important role in putting heat to work and thereby converting energy into useful horsepower. Since the moving parts — the turbine wheel, shaft, and impeller — rotate at speeds up to 50,000 r.p.m., it is important that these parts be accurately machined, fitted and balanced. Some of the more important operations involved in the machining of the turbocharger parts are covered in the following descriptive paragraphs.

The highly heat and corrosion

Fig. 1—Gisholt Model 2F Fastermatic setup for machining alloy steel turbocharger housings.



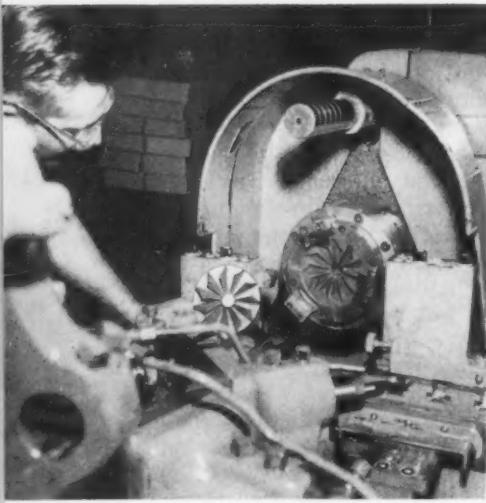


Fig. 2—Special cast Devcon F fixture in chuck of lathe designed to receive vane impeller. Besides providing rigid holding surface, fixture dampens machining noise.

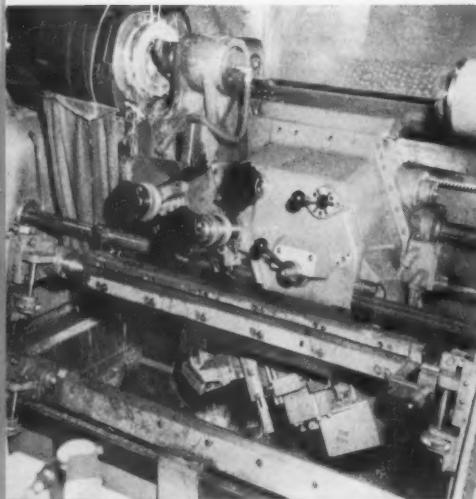


Fig. 3—New Britain GF contour turning lathe set up to machine exhaust housings.

"Wherever possible, carbide cutting tools are used."

resisting parts for the turbocharger which, in actual usage, are located on the exhaust gas or turbine chamber side are made of heat resisting Ni Resist 2B, while those on the air compression side are made of aluminum.

Figure 1 shows a view of a Gisholt Model 2F Fastermatic setup for machining the alloy steel turbocharger housings. The tooling mounted in the turret of this lathe provides for facing, boring a 4.700-inch diameter hole, cutting an oil groove, chamfering a 45-degree angle edge, and undercutting on the bearing side of the housing. For similar but not identical machining operations on the opposite side of the housing another Fastermatic is used, attended also by the operator shown in Fig. 1. Wherever possible, carbide insert type cutting tools are used in the machining of the alloy housings. Tolerances on the housings range between 0.001 inch and 0.0002 inch, depending upon clearance or fit required with a mating part.

Turning down the face of vaneed turbine wheels was an uncomfortably noisy operation until the special plastic driving fixture shown in Fig. 2 was devised. The turbine wheels are cast of Stellite No. 31, a high heat and abrasion resistant material and extremely resistant to the cutting action of a turning tool. When these wheels were mounted in the ordinary three-jaw chuck of the Fastermatic for drilling or fac-

"The advantages of turning by this method include speed and accuracy in the production of duplicate parts . . ."

ing, the turning action created a squeal which could be heard throughout the shop. The toolmaking department suggested the driving fixture shown in position in the chuck of the lathe in the illustration. This fixture was developed by casting one master part into a round mold of Devcon F, an 80-20 aluminum plastic putty, then permitting the putty to harden, and then removing the master part. The resulting plastic driving fixture, when located inside the chuck to form a backing for the parts to be machined, effectively eliminates the chatter and thereby dampens the noise.

The turbocharger exhaust hous-

ings are machined in the New Britain GF contour turning automatic lathe shown in Fig. 3. As the follower "feels" its way along the template located on the rail beneath the carriage controls, the cutting tool traces the path of the contour across and around the workpiece. In this manner, the exhaust housing, as shown in the illustration, is first rough turned across the face and into the inside diameter. A later finish cut provides for cutting a radius and turning down to finish size. The advantages of turning by this method include speed and accuracy in the production of duplicate parts as well as conservation of manpower since one man is cap-

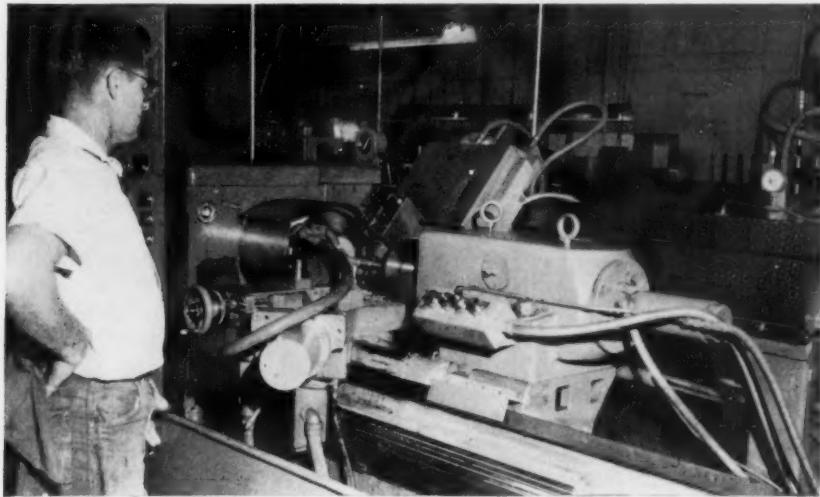


Fig. 4—Machining tool steel shafts on a Cleveland Profiling lathe. These steel shafts, which measure 6½ inches in length, require turning to five separate diameters.

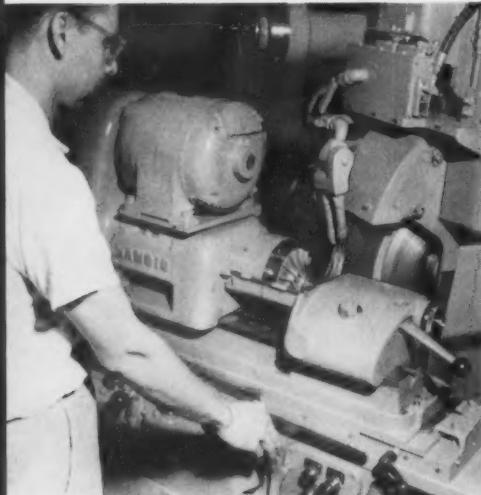


Fig. 5—This Landis Type CH grinder is specially adapted to finish grinding of contoured edges of aluminum turbine wheel vanes.



Fig. 6—Illustration showing setup on Reed vertical type cylindrical thread rolling machine for threading end of impeller shaft.

"Setup enables job to be turned out in 2 minutes."

able of operating several of these machines at the same times once the initial setup has been made.

Both rough and finish turning operations on the tool steel shafts onto which the Stellite impeller blades are later fastened is accomplished on the Cleveland Profiler shown in Fig. 4. These shafts, which measure 6½ inches in length, require turning to five separate diameters: 0.520 inch; 0.583 inch; 0.750 inch; 0.950 inch; and 0.929 inch.

A view of a newly acquired machine for use in the turbocharger production department is shown in Fig. 5. This machine, a Landis 6X30 Type CH Plain Angular Head Grinder, has been adapted to the finish grinding of the contoured edges of aluminum turbine wheel vanes. Prior to the use of the grinder, the contour of the turbine wheel vanes was obtained by means of a turning operation performed on one of the contour turning lathes, and required a total of 12 minutes for one complete turning cycle. The new grinding setup enables the same job to be turned out in two minutes. Two important factors that have contributed toward the time-saving aspect of the operation are the use of a Norton wheel designated 37C46J5V, 24 inches by 2 inches, and the generous use of Cimplus, a cutting fluid that is particularly well suited to the grinding operations.

A threaded section at one end of

"The dies are mounted on parallel axes."

the impeller shaft is obtained by means of the application of the vertical type cylindrical thread rolling machine shown in Fig. 6. This machine is equipped with three dies, equally spaced so that a workpiece inserted between them will "float" while being threaded. The dies are mounted on parallel axes and rotate in the same direction. In operation, all of the dies move toward the center of the workpiece to roll the threads and then recede to release the threaded impeller shaft. The pitch diameter of the finished thread is controlled by the $\frac{5}{8}$ -inch diameter of the shaft and the predetermined distance existing between the three cylindrical dies. The length of thread, which for this shaft is $\frac{7}{8}$ inch, is controlled by a preselected number of turns of the cylindrical dies.

All rotating parts of each turbocharger are individually balanced at rotating speeds up to 1,500 r.p.m. in one of the Gisholt Dynetric balancing machines shown in Fig. 7. These balancing machines operate on the principle that when a part is rotated at high speed, any unbalance effect at one point has a "cross" effect on another. The machine shown is capable of measuring vibratory movement of at least 0.000025 inch.

Figure 8 shows a view of the final assembly operations line where the two sections of the turbocharger unit are fastened together. For ease of handling during assembly the



Fig. 7—View of Gisholt Dynetric balancing machine setup for checking balance accuracy of assembled shaft and impeller.



Fig. 8—This illustration shows a view of nut running operation performed during final assembly of turbocharger unit.

"... turbocharger units are subjected to actual operating speeds for a period of four hours before being readied for shipment . . ."

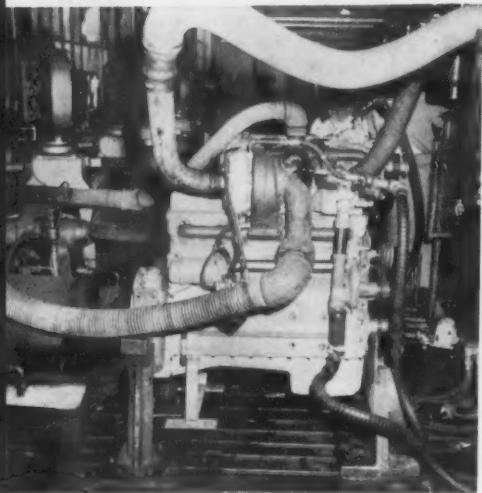


Fig. 9—Each turbocharger must meet rigid test qualifications imposed by long run in test period as shown being performed here.

turbocharger housings are mounted on an angular welded steel fixture which permits revolving the housing end-for-end in order to insert and then tighten down the fastening bolts. During assembly, the housings on their fixtures are moved along the roller conveyor shown in the illustration to various stations where parts are added to complete the assembly.

In Fig. 9 is shown the test run area where the turbocharger units, having been mounted on the diesel engines, are thoroughly subjected to actual operating speeds for a period of some four hours before being readied for shipment out of

the plant. This follows an initial 20-minute test of the turbocharger itself.

The test line is the culmination of long hours of painstaking effort to produce the finest product possible and just the beginning of untold hours of satisfactory, trouble-free operation in service.

★ MODERN MACHINE SHOP ★

New Lessons in Arc Welding. Second Edition. Published by The Lincoln Electric Co., Cleveland 17, Ohio. 320 pages. Illustrated. Simulated leather cover. Price, \$1.00.

The Second Edition of this book is a major revision of this widely used text and reference on manual arc welding. The book has been completely rewritten and reorganized to make it easier to read and use as a text or a reference, and to include information on new procedures, machines and electrodes. Based on arc welding courses taught at the Lincoln Arc Welding School and the experience of other arc welding teachers throughout the nation, it is a practical text for teaching arc welding in vocational, trade and industrial courses. It also is an excellent reference book for weldors, supervisors and others using arc welding in industry.

The book is divided into seven separate sections with each section comprising several lessons. The first section deals with specific instructions on arc welding techniques and

related welding information necessary to the development of the techniques. The next five sections pertain to the proper use of welding machines and electrodes. A final section is principally devoted to reference materials on metals, procedures, testing and weld symbols.

The section on "Arc Welding Theory and Techniques" includes 47 individual lessons. The first is a basic description of the arc welding process; the last is a lesson on pipe welding, a difficult type of welding. Between these two extremes are lessons on technique, which are graduated in difficulty and interspersed with appropriate lessons on such theory as polarity and arc blow.

The next section of the book covers various types of welding machines. The lessons in this section describe the application and operation of motor-generator, transformer, rectifier and engine-driven welders. The lessons lead students through the steps of starting, adjusting the

various controls, operating and stopping the welders. All of the machines are grouped in one section for easy use.

Electrodes are similarly grouped for study in sections which follow the section on machines. The basic groups of electrodes, such as mild steel, hardsurfacing and stainless steel, are each covered in a separate section. Organization is arranged to help the reader select the proper electrode for a specific job. Individual lessons further separate the electrodes into distinct types within each group.

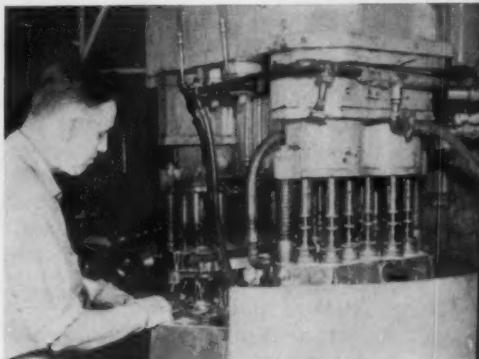
The final section of the book contains general information and procedure data. Considerable material on various types of metals, how they are made, identified and welded is included. There is information on weld testing and operator qualification tests. Extensive data on economical welding procedures for all types of welded steel joints precedes a list of other reference data.



Recessing Tools Reduce Parts Handling

Back chamfering operations on a Baker multiple-spindle machine at the Ford Chassis Parts Plant in Sterling, Michigan, are simplified by using Scully-Jones automatic recessing tools to chamfer top and bottom edges of drilled and reamed holes in rear axle drive pinion retainers. This setup enables the entire job to be done on one machine and likewise reduces parts handling requirements.

For more data circle 1 on Postpaid Card



Operator at Ford Sterling Plant chamfers holes in rear axle drive pinion retainers.



Bombs

Away!

By GILBERT C. CLOSE
Field Editor, Modern Machine Shop

Shop produces aerial bombs of heavy ferrous alloys to same precision as structures of lighter, more workable alloys.

Mass production of military airplanes during World War II inaugurated and sustained the first large-scaled demand for precision sheet metal structures. In a short while, thousands of shops across the nation, both in the airplants and outside shops acting as subcontractors, were producing wing sections, fuselage sections, canopy frames, engine pods, internal and external fuel tanks, and armament pods, and meeting overall precision requirements which, up until that time, they had reserved for single parts being produced on a shaper, planer, or lathe.

At first, and until quite recently in fact, most of these precision sheet metal structures were fabricated from aluminum or magnesium alloys. Shops were tooled for produc-

tion with these materials. Employees were trained to work with them. Jigs and holding fixtures were relatively light in weight—just strong enough for working with the light alloys. Welding jigs were also light weight and designed to cope with the peculiarities of the light metals. Material handling facilities, metal treating and cleaning installations, heat treating facilities, and so on, when installed new, were generally modified in favor of production with the various light metals.

Now suddenly this picture is changing, and the change is gathering momentum. A demand for precision sheet metal structures fabricated from the heavier ferrous alloys is mushrooming. Many of these structures are being used on mili-

tary airplanes in place of the weaker, less heat-resistant light metal structures. Higher air speeds and great engine power necessitates this. More of them are being used and will be needed for guided missiles and rockets. And as a clincher, civilian industry has taken a lesson from the military airplane industry, and has come to regard high precision in sheet metal fabrication as a distinctive and desirable product quality. Where high strength and good heat resistance are prime requirements, these new precision civilian sheet metal products will be made from the ferrous alloys.

This trend adds up to a general situation . . . hundreds of shops throughout the nation which have become skilled in the production of precision sheet metal structures using the light metal alloys

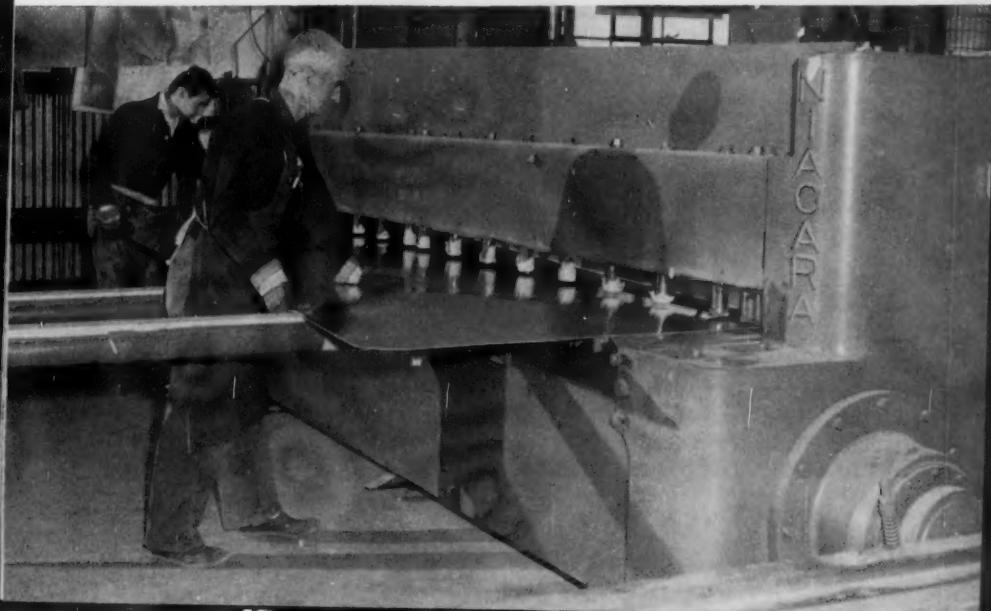
Precision shearing is the first operation in the production of precision sheet metal structures used in aerial bomb construction. A

will have to become equally skilled in producing similar structures using the heavier, less workable ferrous alloys. This will call for many modifications and a few drastic change-overs from the techniques now employed with the light metals.

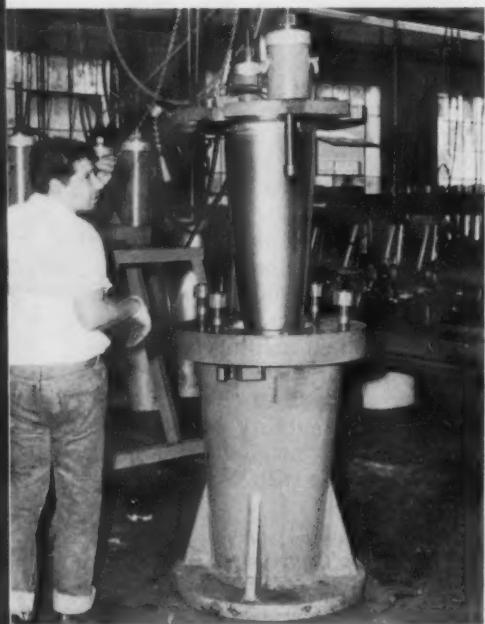
When any one shop is called upon to make these change-overs, very substantial aid can be realized from studying another shop which has made the change-overs successfully. This article will detail how one shop accomplished the feat.

Pastushin Aviation Corporation, Los Angeles, California, was born with and grew up alongside the mass production military airplane industry. From the very first, this company attained an enviable reputation for its ability to produce aluminum and magnesium sheet metal structures with the degree of

good shear, equipped with precision stops and operated by means of an experienced shear operator, is necessary for this job.



"Heat treating, metal cleaning and treating facilities were designed and installed for working with the light alloys."



Blow-pot forming a sheet metal practice bomb section. Part is plugged at both ends and then compressed air at 750 p.s.i. admitted rapidly and with impact force, literally "blows" part outward to fill the die.

precision required by the military aircraft industry. Aluminum drop tanks, sheet metal engine components fabricated from aluminum, and other aluminum and magnesium sheet metal airplane components and sub-assemblies formed the backbone of production. Production of ferrous sheet metal components (mostly stainless steel) was limited in comparison, and us-

ually accomplished on small and very specialized production lines.

As might be expected, the major tooling at Pastushin Aviation was designed for production with the light metals. Presses, forming equipment, holding fixtures, welding jigs, and so on, were ideally suited for working with the light metals. Employees were trained along this line. Heat treating, metal cleaning and treating facilities were designed and installed for working with the light alloys.

Then suddenly the company accepted a contract to produce thousands of practice aerial bombs for the Navy. The bombs were to be fabricated from 1020 aircraft grade sheet steel. Dozens of formed sheet metal components would have to be welded together to produce the finished product. Overall dimensions of the bomb were 10 feet long and 16 inches in diameter, with the usual tapers at both the nose and tail, plus welded-on tail fins for guiding the bomb to its intended target.

Tolerance requirements for the bomb were as follows: plus-or-minus 1/32 inch over its 10-foot length; plus-or-minus 1/64 inch on the 16-inch diameter; the contour could not vary more than 1/2 degree from the center line; the vertical fins for guiding and spinning the bomb after it was dropped had to be spaced and angled within 30 minutes of an arc while being welded in place. It was evident from the first that such close overall toler-

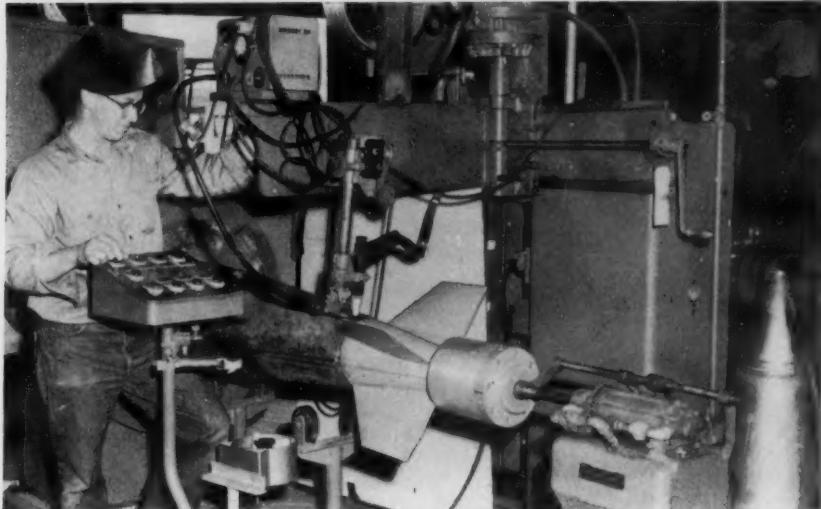
ances would be difficult to hold on a single piece of formed sheet steel, let alone on dozens of formed components after they were sheared, formed, welded into subassemblies, and then into a final assembly.

With long experience in fabricating precision sheet metal structures from the light metals, Pastushin engineers knew that the line used to produce the sheet steel practice bombs would require modifications of major tools throughout. While some error made in shearing and blanking the unit parts prior to forming could be absorbed while jigging for subassembly welding, and some subassembly error could be absorbed while jigging for final assembly welding, the cumulative error throughout the bomb must never exceed allowable tolerances.

Holding error to a minimum in

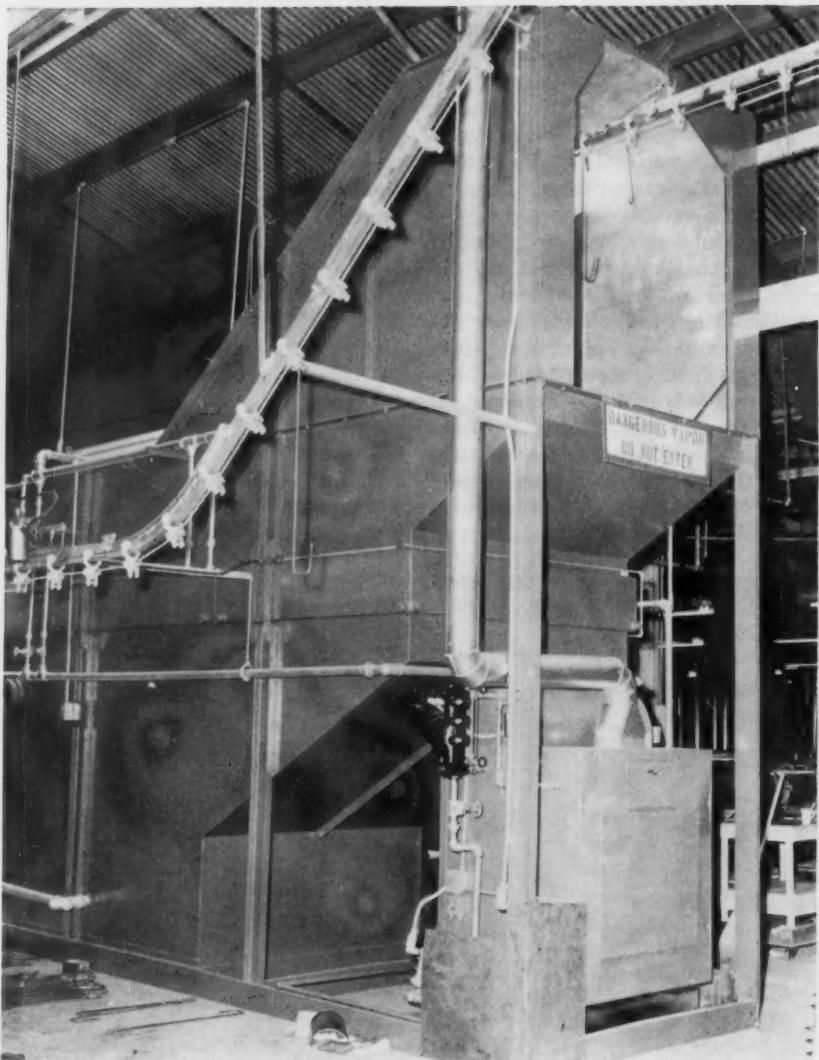
every portion of the production line was a major goal from the start. A substantial and well-conditioned shear was selected for shearing from the bulk sheet stock. An experienced and reliable operator was selected to operate it. The shear was equipped with sets of precision stops so that the various sheared sizes used in producing the bomb could be held to a plus-or-minus 1/32 inch. Dies were designed for blanking the smaller parts which would hold a tolerance of plus-or-minus 0.003 inch.

The next big job was conversion of the semi-automatic and automatic welders which would be used in welding the bomb components. These welders had all been designed and tooled for welding aluminum components. They were equipped with Heliarc welding heads



A converted circumferential welder (formerly used for aluminum welding) joins the practice bomb tail section to the bomb proper. MIG (metallic inert gas) welding is employed.

Bombs Away . . .



Cleaning setup formerly used for cleaning sheet aluminum was not suitable for cleaning sheet steel bomb parts, so this large con-

veyorized vapor degreasing unit was installed. Note compact steam boiler (lower right) used for heating degreaser solutions.

and adjusted for welding speeds of approximately 6 inches per minute.

The welding heads on the welders that would be used for welding the bombs were converted for MIG (metallic inert gas) welding, and welding speeds were increased to approximately 160 inches per minute. The various welding jigs and holding fixtures that had been used for welding aluminum all had to be discarded and replaced, or completely modified and strengthened. While all of them would hold aluminum sheet material with sufficient rigidity for welding, any in use prior to the conversion would have been damaged, warped, or wrecked by the excessive and powerful contraction of the steel components after welding.

Concurrently with the conversion of the welders, a lathe was modified into an automatic trimmer for the circular steel body and end components of the bomb. This lathe will trim one or both ends of the part mounted in it, and hold tolerances of plus-or-minus 1/32 inch while doing so.

The next step was selection of the proper forming process for the conical nose and tail sections of the bomb. While the Pastushin shops were replete with all types of hydraulic and mechanical forming equipment for aluminum components, the relatively little-used process of blow-pot forming was chosen for the steel bomb components. In blow-pot forming, the welded conical bomb sections are placed in a sunken die, are properly plugged at both ends, and then compressed air at 750 p.s.i. is admitted directly inside the part. The

sudden impact of compressed air at this pressure literally "blows" the part outward to completely fill the die. As operated at Pastushin, this process is fast, clean, and extremely efficient. Under maximum production conditions, three parts can be formed in a minute.

The small contour formed and unformed parts which go into the bomb are still bench welded using the Heliarc process. Highly skilled Heliarc welders were chosen for this work to assure maintenance of maximum precision. In a final assembly operation, the nose, mid, and tail sections of the bomb are joined together on an automatic circumferential welder equipped with a MIG welding head. Critical and rigid jigging during this final assembly welding operation assures



Detail in tail fin section of bomb. Each part is held to minimum tolerance error to meet required tolerances on completed bomb.

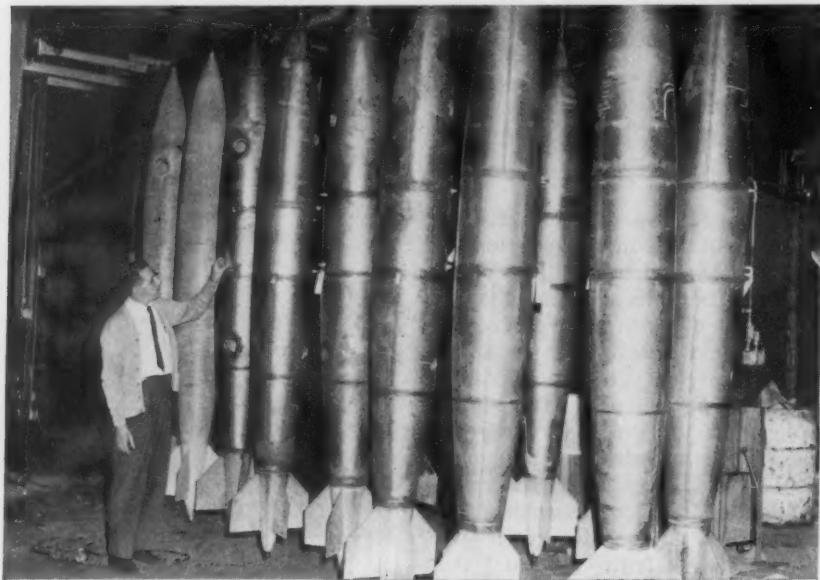
"The bomb is rolled and agitated to assure complete interior coverage."

that each bomb will fall within the specified length requirements.

Final testing of the bomb (in accordance with specification requirements) is performed in conjunction with the first finishing operation (slush-coating the interior of the bomb with primer). This is accomplished on a small, circular, continuously moving line. When the completely assembled bomb leaves the final circumferential welder, it is placed on this moving line. At the first station, the bomb is picked up by the hanger which will attach it to the airplane, and

the hanger is pull-tested to a specified limit. At the second station, approximately 30 gallons of primer is fed by gravity into the bomb from an overhead primer tank. The bomb is then rolled and agitated to assure complete interior coverage.

At the next station, the filler orifice on the bomb is inverted over a drain tank so that the unused primer will spill out. This salvaged primer is then pumped back into the overhead storage tank. Immediately following this emptying, the bomb is filled with compressed air at 30 p.s.i. If any one of the numer-



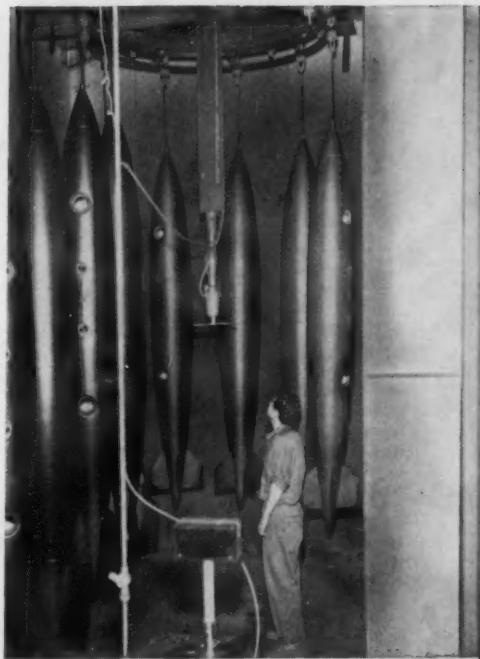
Completed sheet steel practice bombs pass inspection on way to finishing department.

ous exterior weld seams is defective, the still wet primer on the interior surface will be driven through by air leakage and mark the spot on the exterior of the bomb where the defect exists. This makes the location of weld faults an automatic operation accomplished in conjunction with load testing the bomb at the specified interior loading of 30 pounds per square inch.

At the final station on this short line, the bomb is upended so that all surplus primer will run to one end. This surplus is then blown out by another charge of compressed air, and the bomb is ready for final finishing.

Specified finish requirements call for an etch prime coat, a prime coat, and a final lacquer coating. To apply this three-coat finish system in a single operation, Pastushin engineers installed three Ransburg No. 2 electrostatic paint spraying units in three side-by-side paint booths so that a single conveyor carries the bombs through each booth in sequence. As all of these coatings employ quick-drying materials, the bomb is ready for the next coating by the time it reaches the next booth. When it emerges from the third booth, it is ready for stenciling of the required external identification. This is accomplished by workmen on a platform paralleling the conveyor after it emerges from the third electrostatic booth. The conveyor then continues onward and carries the bomb directly into a waiting box car.

Pastushin engineers are the first to admit that numerous "bugs" crept into the conversion job as it progressed. This was to be expect-



Here the bombs are shown passing through the final booth of the three-booth electrostatic painting setup which applies three finish coats in consecutive, non-interrupted operation. After stenciling, the bombs continue on conveyor directly into a waiting box car.

ed. They admit just as readily, however, that a bit of intelligent engineering can accomplish the job just as readily in any shop organization now producing precision sheet metal structures with the light metals, but faced with accomplishing the same work with the ferrous alloys. Their only word of caution is . . . "Don't try to do it without first converting and adapting the tools, or those 'bugs' will multiply in much the same manner as the proverbial Easter Rabbit."

Welding Pays Dividends

By HOWARD E. JACKSON

Top view shows operator welding casing plates to angle iron frame by the sigma process. Bottom view shows die-formed fan wheel blades being arc welded to outer rings in a unique jig.



By using sigma welding and employing a number of shortcuts for other types of welding, Western Blower Company of Seattle, Washington, is saving 50 percent of the costs previously involved in the fabrication of volume heaters — central air conditioning units for filtering, heating, cooling, humidifying, and dehumidifying air in schools, churches, offices, factories, homes, stores, halls and theatres of various types.

Western Blower manufactures a number of other products including turbine multiblade fans, pulley-driven utility fan units, turbine electric ventilating units, air washers, speed planing mill exhausters, radial blade volume and pressure fans, spirovane propeller fans, unit heaters, high pressure blowers, centrifugal exhaust fans, tanks with "U" tube coils, Olympic converters, coolers and heaters, and Wix Galley Maids—water heaters for marine use. While savings have also been effected in many of these other products, this article will highlight the savings effected by welding in the fabrication of volume heaters.

As with other products, volume heaters are custom built. There are

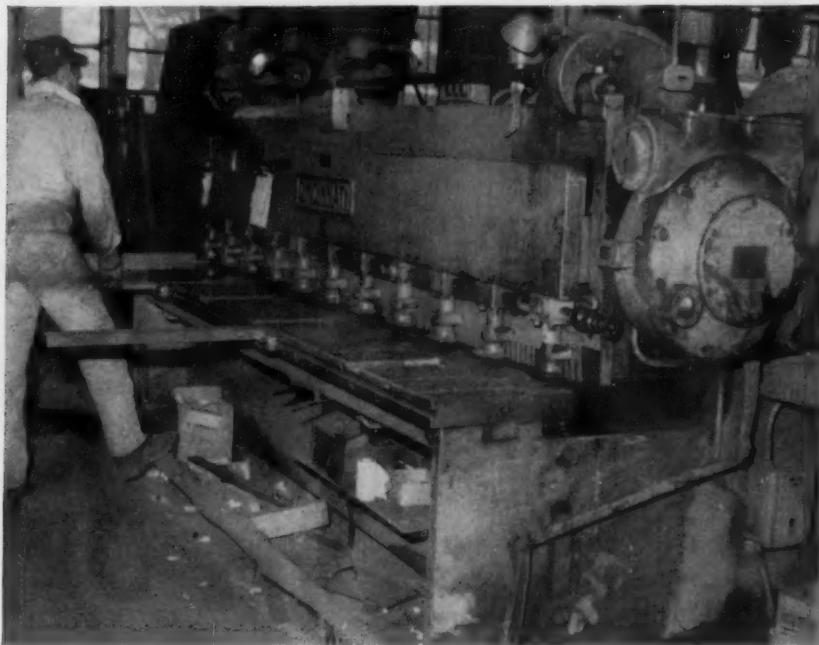
**An outline of the cost-saving welding techniques
employed at Western Blower Company
in the fabrication of volume heaters.**

★ ★ ★ ★

14 basic models, made to blow vertically or horizontally, making 28 models, plus those with more or less than standard equipment. They are of rectangular shape, up to 5 feet high, 9 feet wide and 10 feet long. Originally they were hand made like a box, with fancy corners, all edges broken and folded and bent overlapping. Literally thousands of bolt holes had to be drilled, and as many bolts used to hold the units

together. It was time-consuming work. Moreover, the finished casings were not as strong around the edges as desirable, which, in turn, presented some shipping problems.

The 50 percent savings over the braking and bolting method were made possible by employing the following steps (no braking, drilling or bolting except on an internal partition): First, an angle iron frame is built up to required



Casing sheet is shown being cut to inside angle frame diameter on Cincinnati shear.

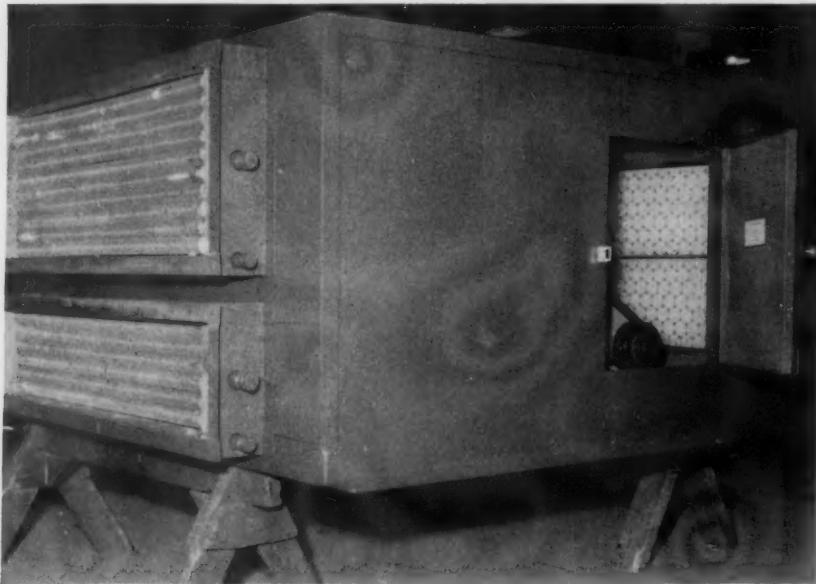
**"... the sheets are laid in the frame
and sigma welded all around."**

size, using $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$ -inch or $2 \times 2 \times 3/16$ -inch angle iron, according to the size of unit. The angle iron is cut with square corners on a Pels angle shear, and bevel corners are cut on a Grob band saw. The pieces are then manually electric arc welded together into a box-like frame using a Wilson d.c. machine and $\frac{1}{8}$ -inch 6012 Genex type electrode. Next, the corners are ground smooth, and the frame is ready for the casing sheets.

The 18 to 12 gauge cold rolled sheets are cut to the inside diameter of the angle frame on an 8-foot

Cincinnati shear. (Standard size sheets are used. If two pieces are needed they are bolted together.) Then access holes and air inlet and outlet openings are sheared with a Pullmax universal shearing and forming machine. Next, access door frames are spot welded to the necessary sheets on either a small Acme or a larger shop-made spot welder.

Now the sheets are laid in the frame and sigma welded all around. It was this sigma welding, set up by Linde Air Products Company, that changed the whole procedure



New type Western Blower volume heater fabricated by means of sigma welding process.

in making these volume heaters . . . for sigma welding made the idea of a frame possible, which in turn eliminated braking, bolts and nuts, and improved the product for shipping by making it stronger. The sigma semi-automatic machine, equipped with an Oxfeld No. 65 rod makes its button-like weld quickly and cleanly as the operator shoots a spot with the gun every two seconds per weld, 30 welds per minute. Since 240 sigma welds are shot per average-sized volume heater casing, it is quite apparent that the sigma welding accounts for much of the 50 percent saving in making this product.

The fans are another step in fabricating the volume heaters that is worth mentioning, welding-wise. The fan housing is made more or less conventionally, of 18 to 14 gauge cold rolled steel, rolled to shape with continuous electric arc welded side sheet scrolls (cut on the Pullmax and formed on a press brake), but the heavy duty double width inlet, forward curved, slow speed fan wheels are made by means of a welding setup worth noting. The wheel blades are die formed and arc welded to the outer rings and the center spider in assembly jigs (that are quite unique) to insure test performance.

Previously, the rotors were made with a flat plate, notched and twisted so that the fingers tuck out of one plate. It was very complicated die work, and the company had trouble with the wheels getting out of line. Now the curved slots in the center spider are sheared out on a punch press.

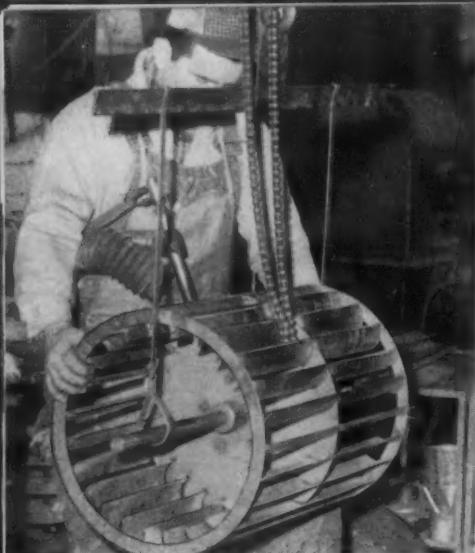
In welding, the center spider is



Welder uses small hydraulic press to pry off outside jig plates after welding fan blades to center spider and outside rings.

slipped over and into the jig, and the wheel blades are put in place. The two outside rings that hold the outer ends of the wheel blades are set in slots in the weld jig holding plates. These outside plates are held so tightly in place it is necessary (after electric arc welding the blades to the center spider and outside rings) to wedge them off by means of a small hydraulic press. The result is a true wheel, much truer and more rugged than previously made wheels. There is some savings, but more important . . . a better fan.

The mountings are worth noting. Fans in two-fan units are rigidly tied together to form an integral unit. Fans in both single and two-fan units are mounted on "rubber in shear," thereby completely isolating the fans from the volume heater casing. This unique con-

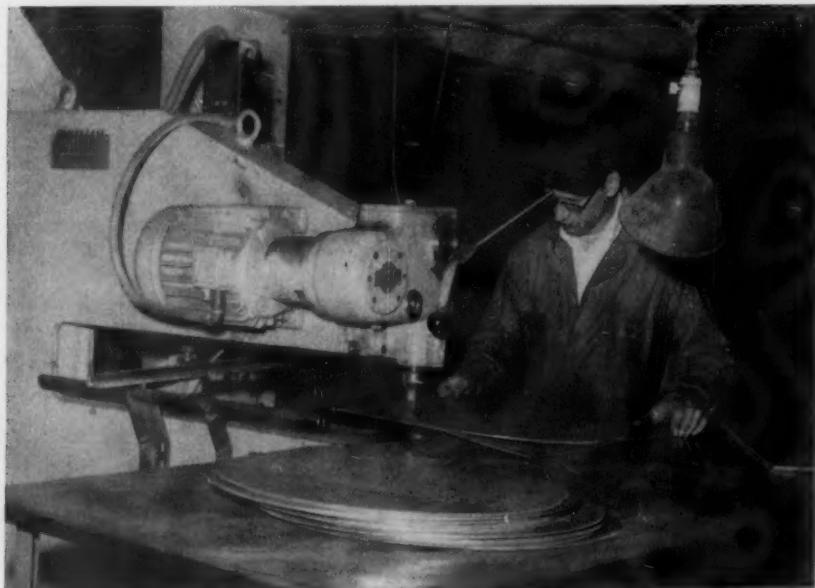


Heavy fan wheel is held in place at Acme spot welder with the aid of a Budgit hoist.

struction eliminates any possibility of transmitting vibrations to the coil piping. Motors are isolated with rubber mountings.

It might also be mentioned in passing that when fan wheels require spot welding on the Acme spot welder a $\frac{1}{4}$ -ton Budgit hoist is used to position and hold the heavy wheels (50-60 pounds) at the spot welder . . . the overhead monorail running directly over the welder.

While the welding of the volume heaters has been the main subject covered in this article, it should be pointed out that this is but a small part of the welding done at Western Blower. A great deal of electric arc welding goes on all the time in the steel fab shop, where welding



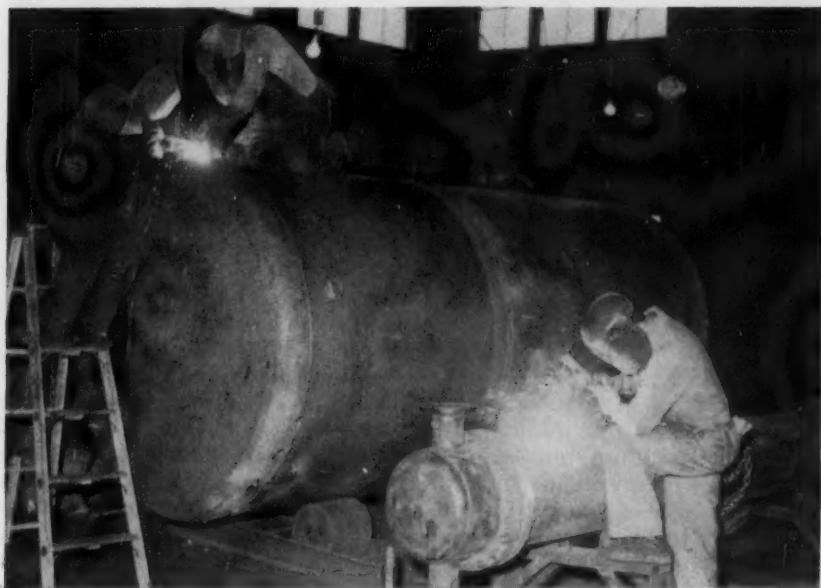
Fan housing is shown being cut to shape on a Pullmax shearing and forming machine.

and burning on many products takes place (bases for canning machines, conveying machinery and other items in addition to company products already mentioned). In addition, considerable inert arc gas welding (Heli-arc) is performed in this shop. Sometimes a rod is not used (the metal is just fused with the electrode) but when a rod is used, the type depends upon the metal . . . and all metals are welded, using Miller or Westinghouse machines and a Linde gun.

In the main manufacturing-assembly shop (volume heaters are separate) still more electric arc welding is done. (This is standard welding.) A last, noteworthy little item in this shop is the special grinder setup for grinding blower



Welder is shown using a Linde Heli-arc welding gun to weld a stainless steel deflector.



This view shows large hot water storage tank and converter being electric arc welded.

"... machine has a motor that is mounted upside down and equipped for turning shaft at two revolutions per minute."



View showing special grinding set up used for grinding blower wheels at all angles.

wheels at all angles. An old car axle is used because of its taper which holds and centers the different sized bore wheels in the holding-turning machine set up on a steel table. This machine has a motor that is mounted upside down and equipped with a drive gear reducer for turning the axle shaft at two revolutions per minute. The adjustable grinding unit can be pushed into place on the table by means of rollers, positioned and clamped with an air cylinder that pulls the hold-in-position bar down over the base of the unit. The air cylinder is mounted on the under-

side of the steel table. There is a wide slit in the table so that the hollow bar can be turned, positioned and clamped tight for any angle grind desired on the blower wheels. The operator sets the turning machine and grinder unit as needed . . . and the grinding is done automatically. (Carborundum Aloxite resinoid grinding wheels are used.)

It might be said of the Western Blower Company that it welds everything it can . . . and now uses bolts only where it cannot weld. An example would be on the individual fans and blowers (not in volume heaters), where huck bolts (those

crosses between a bolt and a rivet employed in the aircraft industry) are used in conjunction with a compressed air gun to fasten them in place. The big story, however, is in welding . . . welding that saves 50 percent of the fabricating costs on volume heaters.

★ modern machine shop ★

Essential Strength of Materials.
By Frederick R. Lisarelli. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. 261 pages. Illustrated. Cloth binding, board covers. Price, \$4.75.

This one semester text is intended primarily for technical institute and college courses where calculus is not a prerequisite. It is especially suited to training programs in industry.

Here the theory of strength of materials has been developed with the use of algebra and trigonometry alone. Formulas which cannot be derived without the use of calculus have been assumed.

The material is presented in a simple, concise and straightforward manner so that it is easy for the student to understand. To achieve this purpose, the author has included many helpful features. Among them are the following. Examples are worked out in detail without leaving steps to be supplied by the student. The problems are worked out with direct applications of the principles which immediately precede them. Tables of properties of materials are included as they become necessary for the solution of problems.

A chapter on centroids and mo-

ments of inertia precedes the study of beams; this is intended for students who may not have a course in mechanics. It also serves as a review chapter for students in the regular program.

A section of the chapter on Simple Stresses deals with the accuracy of computation and significant figures so that the student will not try to overestimate the accuracy of his results. The section on welded joints has been developed in step with the latest American Welding Society recommendations, and includes calculations on the strength of welded joints.

The flexure formula has been developed as a direct application of the basic simple stress formula, thus permitting the use of algebra in its development.

These features along with the logical sequence, carefully selected illustrative examples and problems, make this text highly teachable.

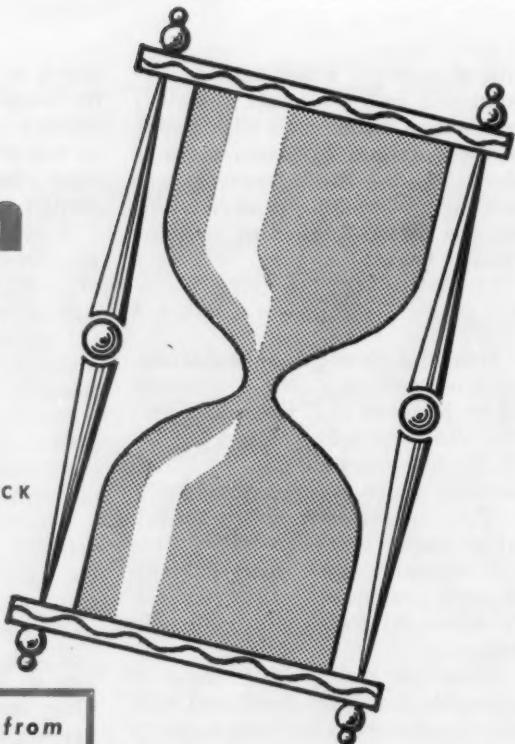


"... and this here is . . . well, it's probably better that you don't know him."

the stolen years

By

LAWRENCE G. DERTHICK
U. S. Commissioner of Education



The following article from SCHOOL LIFE is somewhat removed from the usual technical article appearing on these pages but because it carries a message of great import to every adult in our country we felt justified in publishing it. The author outlines the penalty we must pay for overlooking our responsibility to furnish adequate educational facilities.—Ed.

Of the 31.5 million children in our public schools last year, there were 2.3 million for whom we actually had no room.

But we made room for them somehow. We had to. We crowded

more desks into limited classrooms, we resorted to buildings not intended for school use, we went on half-day schedules. And in the end, we managed.

In the end, however, we were not proud of what we had done. True, we had provided schools for those 2.3 million, but only a makeshift kind; crowded and inadequate quarters for 1.5 million of them; less than a full day for the other 840,000.

We had done even worse. Every time we had opened the door to a classroom and ushered in another child, we had taken a little

more space from each child already there. And so, in the end, we had crowded not only the 1.5 million but every one of their classmates.

This year we're leaning on the old halfway measures again. Again, we have to, for our severe shortage of classrooms continues. Again, we are crowding millions of children into our schools. Again we are slashing the school day for hundreds of thousands more.

For all these children and their teachers I feel a deep concern. But at this moment I want to concentrate on those children who have only half-day schedules, whose teachers are burdened with double shifts. What, actually, is happening to them in school?

Children on half-day schedules attend school less than the 5 or 6 hours most States require as a minimum. If they are on the single 4-hour session so common nowadays, they are deprived of an hour a day, on the average. And by the end of a school year they have lost a full 2 months. Multiply 2 months by the number of years this condition continues, and you will see that elementary children alone could lose almost 2 full years of schooling.

When we steal school hours and days and years from children, we rob them of much more than time.

We rob them of learning.

Obviously, something has to yield in a schoolday cut back to 4 hours: speech correction and remedial reading, for example . . . well-rounded health programs . . . music . . . fully supervised study.

The closer we look, the longer the list of deprivations grows.

Even reading, writing, and arithmetic, which the schools work hardest to preserve in the curtailed curriculum, are hurt by the change. Already we have impressive evidence that children in half-day sessions do not make the same gains in these subjects as full-time pupils.

In fact, the half-time pupil may not ever really know the exhilaration of being expertly taught; for the double-shift school system, if it does not completely discourage the talented teacher, is certain to curb his art.

We rob them of serenity.

Whether they attend in the mornings or in the afternoons, half-day children know the frustrating fatigue that follows on a tight schedule. They feel hurried; they are rarely



"I think it's silly to bother you doc,
but the foreman keeps insisting that
I have my eyes examined."

The Stolen Years . . .

relaxed; they never have quite enough time to finish a job. They have no time to dream, to linger with a thought.

They share their desks and materials with the children in the shift that precedes or follows them. Not only do they miss the many small satisfactions of ownership and privacy, but they are frequently upset by the inevitable conflicts over property.

The tensions pursue them even into their homes, where their unusual hours disrupt the family routines and build up stresses and strains in their family circles.

We rob them of guidance.

Both at home and at school, half-day children miss the reassurance that comes from a firmly guiding hand.

They miss it at home if their mothers work, as many do in this country, where every third married woman holds a job outside her household. Even on a full school schedule, the children of working mothers spend some unsupervised time at home; on a half-day schedule they spend even more. For too long each day they have no one to see that they use their time wisely and well. They get into mischief, they develop bad habits, and all too often they lose their feeling of security.

At school they miss the advantages of supervised study, of supervised play. In the mass-instructed classroom they are neglected and

submerged. The teachers, preoccupied with the complications of their double loads, cannot get to know their pupils individually. Thus the child who is not adjusting well to school, who has trouble making friends, is likely to be overlooked at the very time when sympathetic attention and wise supervision could still save him from unhappiness and failure.

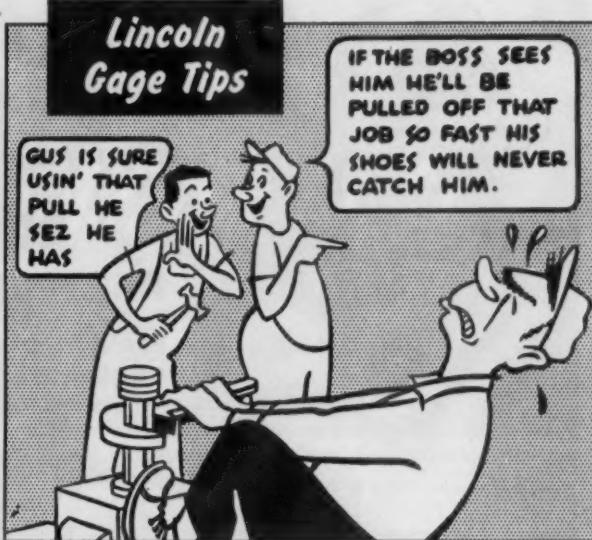
We rob them of learning, serenity, and guidance. We accuse ourselves; and we stand aghast at the magnitude of our theft. Without learning, this coming generation will be poorly equipped to work, to think, and to serve their fellows. Without serenity, they will know no joy. Without guidance, they will certainly find no wisdom.



"An' be sure to clean behind the gears, too!"



Lincoln Gage Tips



DON'T USE FORCE . . . you will ruin a precision measuring tool. If the proper gage, particularly a Lincoln gage, does not enter the hole smoothly, there is some operation along the production line that needs correcting. Thread gages are ground and lapped to extremely close tolerances; sometimes as close as .00005 of an inch.

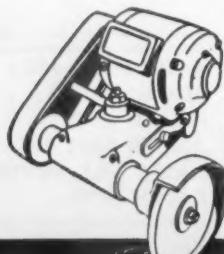
We, at Lincoln Gage, feel it a privilege to produce plug and ring gages for our customers. That is why we try to make each one a masterpiece of precision workmanship. And we believe that is why our customers continue to do business with us.

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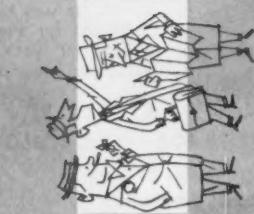


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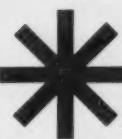
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Machining Stainless Steel

*A solution to the problem of poor surface finish
in cutting off a $\frac{5}{8}$ -inch stainless steel
round is presented.*

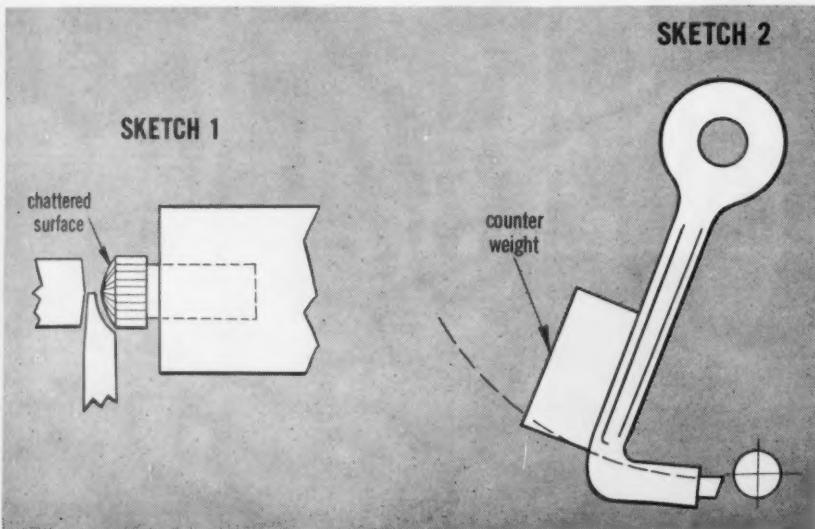
By G. J. STEVENS
Machining Engineer, Armco Steel Corporation

Problem:

Poor surface finish and chatter resulted when $\frac{5}{8}$ -inch round Type 416 stainless steel part was cut off in a multiple spindle automatic machine. A combination cut-off and finish form tool was being used and the finished part was held in a pick-up attachment (see Sketch 1 in the illustration provided below.)

Solution:

After studying the problem it was decided that most of the chatter was caused by the knurled surface. This set up vibrations that were transmitted to the cut-off tool. Consequently, a heavy counterweight was bolted to the cut-off tool arm. The added weight decreased vibration (see Sketch 2).



Sketches show how vibration was eliminated in cutting off $\frac{5}{8}$ -inch stainless steel round.

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INDUSTRIAL LEADERSHIP



CAN KEEP THE WORLD AT PEACE



By ALFRED M. COOPER
Contributing Editor, Modern Machine Shop

The author concludes his discussion of how the industrial executive can assure his children their opportunity to continue living in a free country.

In the prevailing period of international stress, there are certain specific things the industrial executive can do that will be of almost unbelievable assistance in assuring to his children their opportunity to continue living in a free country.

(1) Our industrial executives often find their duties worldwide in scope, and while on company business (selling, distribution, engineering and construction) often are in a unique position to explain away foreign misconceptions regarding this country and its way of life. This is a splendid service in the field of industrial leadership toward world peace.

However, there is a distinction

here that should be noted. As many executives have pointed out, it is always permissible to correct misconceptions, particularly those that have been skillfully planted by the propaganda of an enemy. It is another thing to attempt to persuade the people of another country that our way of life should be substituted for theirs. This may well be presumption on our part. We know the free enterprise system is the only system for us. We should carefully study the people of another land, their background and traditional beliefs, before taking on the role of world reformer.

It may be remembered that we tried this method right after World War I, and as a result half of the

people of the world were soon living in "republics." A few years later, however, most of these republics had degenerated into dictatorships, from which emerged the ambitions and jealousies that shortly plunged us into a second world conflict. It is also well to bear in mind that our motives may readily be misconstrued, and we thus furnish more ammunition for those persons who wish to see us branded as "imperialists."

(2) Perhaps it will prove more to the point for the industrial executive to study his own subordinates, in order to determine how he may best aid these people to a better understanding of the advantages to them of the preservation of our traditional way of life. By this I do not mean that he should harangue these people on anything. This always smacks of paternalism and creates resentment.

The executive will recognize at once indications that his juniors may have somewhere picked up some Marxian philosophy, almost inadvertently. In such instance, he is justified in making every reasonable effort to straighten out these people before their mixed-up thinking gets themselves and their country into trouble.

In this connection it is most heartening to note the efforts of such companies as Republic Steel and the associated electric power companies to use valuable advertising space for the purpose of carrying on a steady, but unobtrusive campaign of selling democracy to Americans — perhaps "reselling" would be the better term. Moreover, our Treasury Department's adver-



"... while on business industrial executives are in a position to explain away foreign misconceptions regarding this country . . ."

tisements to promote the sale of U. S. Savings bonds have developed into a most heartwarming series of vignettes depicting the accomplishments of great Americans under our present free enterprise system.



"... the executive will recognize at once indications that his juniors may have somewhere picked up some Marxian philosophy."

"One of the greatest services the industrial executive renders in aiding the preservation of democracy often goes unnoticed . . ."

(3) One of the greatest services the industrial executive renders in aiding in the preservation of democracy often goes unnoticed, both by him and the "observers of the national scene." In this instance he simply takes good care of those working for him, sees to it that pay rates are satisfactory and working conditions good. This executive is a stickler for safety on the job and is constantly aware of the physical condition of his subordinates. He is willing to make himself a bit unpopular in the front office in his attempts to secure the best for those who report to him.

This workaday demonstration of democracy in action is not dramatic but when the chips are down it will be found that there are al-

most no defaulters in that executive's division. *It is next to impossible for any foreign ideology to be implanted in the minds of satisfied, well-paid, well-treated employees.* The good executive knows this almost without having thought the matter through and acts accordingly. Somewhere along the line he has learned from his own experience that it is almost impossible to create defection among loyal well-treated employees. Multiply this executive by the tens of thousands like him in American industry and you have perhaps the greatest existing force on earth that will ensure the continuance of the American way of life.

(4) In addition to studying the value of good industrial relationships, the competent executive in private industry soon learns the imperative importance of good public relationships. That is, he becomes impressed with the fact that he has a definite duty to do everything in his power to improve public attitude toward the company employing him, toward the industry in which he works, and toward the private enterprise system as a way of life, and as the best way to get things done.

Once alert to this responsibility the executive can make suggestions for changes in routines within his own division, as well as among any "staff" divisions (safety, personnel, training, etc.) which serve all production divisions in his



"It is next to impossible for any foreign ideology to be implanted in the minds of satisfied well-paid, well-treated employees."

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March, 1958

modern machine shop 139

"Any ammunition inadvertently given these demolition squads cannot help but injure our industries . . ."

plant. He soon comes to appreciate that *there exists in this country a small but well-organized force of publicists who, though not members of any subversive organization, nevertheless simply do not believe in private enterprise*. Any ammunition inadvertently given these demolition squads cannot help but injure our industries, and through these, our freedoms.

In combatting such activities the executive does not need to develop into a public relations officer. Rather, he simply keeps his eyes and ears open, and when anything comes to his attention that he believes may be detrimental to the public's attitude toward his company or industry, he reports these matters to the public relations officer. This executive is trained in methods of meeting and blunting the edge of either overt or undercover criticism. He also knows the approximate source of such inspired criticism, and is in a position to determine when such efforts at obstruction appear to be of a nature that should be called to the attention of the FBI for more detailed study.

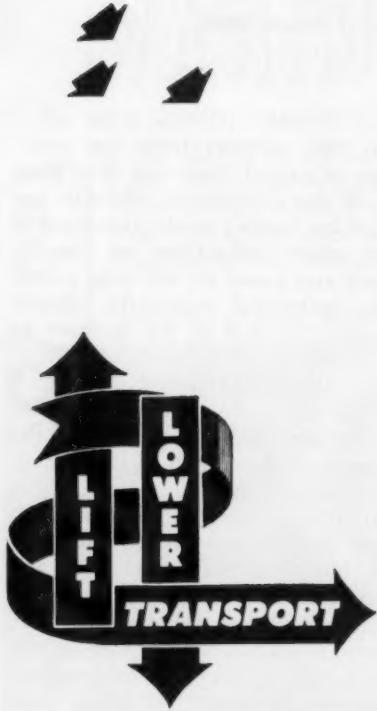
(5) In a number of our greatest industries, such as General Motors, General Electric, and Westinghouse, executives are taking the lead in the movement to insure that our industries will never again suffer disastrous shortages of skilled labor or engineers or scientists. In the beginning, when such shortages

became painfully evident, these executives concentrated their efforts on devising methods which would temporarily alleviate. Now they have gone a long step farther in a determined move to strike at the root of this problem without loss of time.

Thus, when it became clear that the school authorities were correct in placing the blame for these shortages on a serious dearth of trained teachers, these companies at once set about training, or subsidizing the training of teachers of science and mathematics courses. This forward-looking move called for the appropriation of hundreds of thousands of dollars to institute special training courses. More important, perhaps, the great lab-



"... there exists in this country a small but well organized force of publicists who simply do not believe in private enterprise."



A portable, height adjustable, steel table-truck-work bench! Used for die transfer, machine feeding, assembly (at best height, in best light). For lifting, lowering, transport of all compact, heavy loads. Saves "handling" accidents to both men and materials. Saves minutes for men wherever used.

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HAMILTON, OHIO

"... Russia gives indications of moving closer and closer to private enterprise methods . . ."



"... industry decided that the problem must be solved at once and thereafter took the necessary steps to implement this decision."

oratories of these companies were also made available to these student teachers—laboratories that have no counterparts in any university.

Thus, at a time when school authorities appeared to doubt that this problem could be solved in many years, *industry decided that it must be solved at once, and thereafter took the necessary steps to implement this decision*. And those of us who have complete faith in private enterprise as the most efficient way to get things done were furnished with an uplift of renewed confidence.

The five points listed above may be of interest to the executive who finds himself serving in a period of great international stress. During these ticklish times he may

also take comfort from the assertions of expert observers that Russia, in her determined effort to improve her factory production records also gives indications of moving closer and closer all the time to private enterprise methods, almost against the will of the masters at the Kremlin.

Or, the executive may not. Certainly we have never met with much success in persuading the Russian leadership to do anything. If it should turn out that affairs take this amazingly satisfactory turn, no one will be happier than our industrial executive. In the meantime he will remain watchful, prepared for any eventuality, while continuing to hope that Russia will learn that government by bureaucracy simply cannot get things done efficiently. When that day comes he will know something approximating our way of life can exist over there. Freedom and bureaucracy can never flourish in coexistence.

More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 340.

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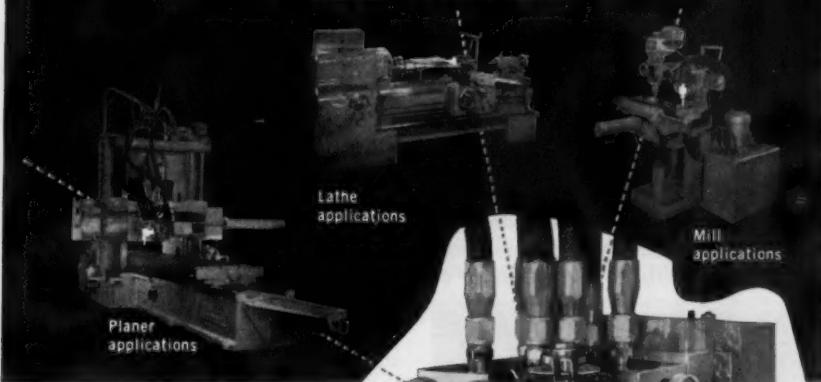
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production
through
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more production through modernization

**Techniques for increasing output with
newly developed machines and tools.**

Edited by LOUIS H. DOERMAN

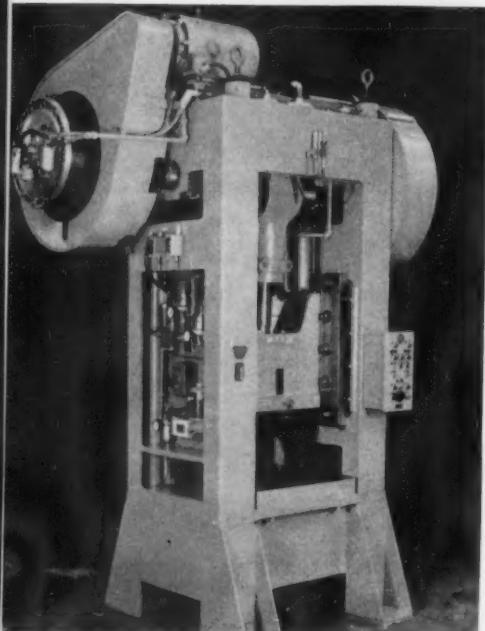
Ductile Iron Castings Cut Press Size and Weight

By using ductile iron instead of conventional cast iron in the head and bed assemblies, the weight of

135 and 150 ton stamping presses has been reduced by 8,000 lbs. and the height by nearly two feet. Ductile iron (60-45-10) is used for the press bed, pinion gear and head castings. The application of this material to the pinion gear is claimed to be ideal in view of its outstanding resistance to wear.

The head of the press is a composite of ductile iron and steel beams welded together. The more complicated parts are made as castings while the simpler parts are standard structural shapes to facilitate fabrication. Since the heads are rough worked before welding, their cost is approximately ten percent lower. Welding lips were provided on the head castings to permit the welding of parts of equal cross section. This facilitated and speeded the welding operation and at the same time reduced stress concentration in the welded sections.

The head and columns are hollow and can accommodate the control wiring and other piping, providing protection without the expense of a total enclosure. This arrangement eliminates close and exacting piping and wiring layout and installation,



Using ductile iron removed 8,000 pounds.

Typical Mechanical Properties of Ductile Iron Compared with Other Materials

	Material Specification	Tensile Strength	Yield Strength	Elongation	BHN Hardness	Modulus of Elasticity Million psi
Cast Iron . . .	Class 40	40,000/45,000	(No true yield)	nil	220/240	15-17*
Malleable Iron	Grade 32510	50,000/53,000	32,500/34,000	10/13%	110/145	25
Cast Steel . . .	Grade 60-30	60,000/70,000	30,000/35,000	24/28%	130/170	30
Ductile Iron .	Type 60-45-10	60,000/80,000	45,000/60,000	10/25%	140/200	24
Ductile Iron .	Type 80-60-03	80,000/100,000	60,000/75,000	3/10%	200/270	24 *Apparent modulus

saving a considerable amount of time in making connections to control boxes and fittings, since holes are cut in the backs of boxes and wires are nipped in. This semi-enclosed type mounting is easy to install and standard control boxes can be used, mounting the equipment semi-flush. There is no exposed piping at the floor level.

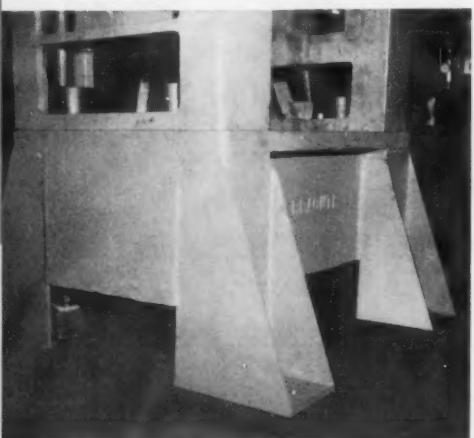
The press bed is a composite of ductile iron welded to fabricated steel plate legs. The good machinability of the ductile iron parts has effected about a ten percent savings in machine shop time and labor, according to the builder, Ferracute Machine Co. Its resistance to wear, shock or elevated temperature effects permits the replacement of more expensive materials by ductile iron. Since it is markedly superior to gray iron in applications involving impact loads, this press bed application is specially beneficial and appropriate. The welded steel legs weigh only half as much as would have been the case if they had been cast on the bed in one piece.

Ni-Rod "55" electrode was used exclusively in welding the composites because it eliminated the



Ductile iron is generally easily welded.

More Production . . .



The press bed is a composite of ductile iron welded to fabricated steel plate legs.

need for heat treating after welding. Ductile iron is easily welded to ductile iron and to other materials such as carbon steel, stainless steel and nickel by the metal arc process, using the techniques normally employed on good grades of gray iron. The most easily welded types are 60-45-10 and the high alloy variety. It can also be brazed, gas welded and overlay welded. Crack-free overlays can be deposited on the surface of ductile iron using commercial hard surfacing rods to provide special abrasion or corrosion resistance. It is also readily brazed with silver or copper brazing alloys.

In manufacture, the castability of ductile iron makes it possible to specify sections as thin as 1/16 inch in green sand molds at normal foundry pouring temperatures. Be-

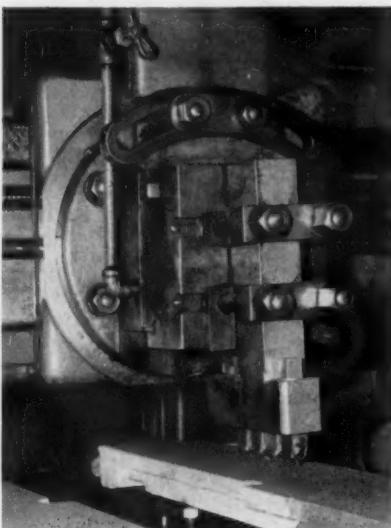
cause of spheroidal graphite structure, machinability is approximately equal to that of gray cast iron of the same hardness. In addition, toughness of ductile iron annealed to a yield strength of 40,000 p.s.i. and elongation of 15 percent is equivalent to that of ordinary grades of mild carbon steel.

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★ modern machine shop ★

Planer Toolholder Speeds Production

By specially designing a planer toolholder and replacing HSS tooling with carbides, The G. M. Diehl Machine Works, Wabash, Ind., has recently been able to save time and money. The four-gang planer toolholder was designed to



The four-gang planer tool holder is shown with the money saving tooling and inserts.

use a SLOW-SPEED drill
for GRINDING?

and why
not?



One of the final steps in the production of propellers at McCauley Industrial Corporation is the anodizing of the propeller blades. To insure complete coverage in the vat, each blade is attached to the dipping fixture by an expanding bolt fitted into the opening at the hub end of the blade.

After anodizing, this opening must be carefully finished to remove any burrs caused by the expanding bolt. The shape of the opening requires the use of a cone wheel. The work to be done requires a slow speed tool, much slower than would normally be used with an abrasive attach-

ment of the type and size used here.

So, for this metal removal job, a Buckeye drill, with cone wheel attachment, was recommended! It's a small tool, just 7 inches long; it's a light tool, less than two pounds. Makes it easy to get a perfect finishing job every time, without disturbing the exact tolerances typical of McCauley props.

The Buckeye Tools approach to unusual portable tool problems is refreshingly free from time-worn traditions and preconceived notions. Perhaps this uninhibited approach could help solve your portable tool problem.

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More Production . . .

hold four Kindex Style KSDN-12 tools with Grade K6 square inserts. The tools are offset from each other by 0.055 inch. The redesigning permits the rough planing of five 31 x 80 inch cast iron, saw table tops in the time formerly required to plane two of them.

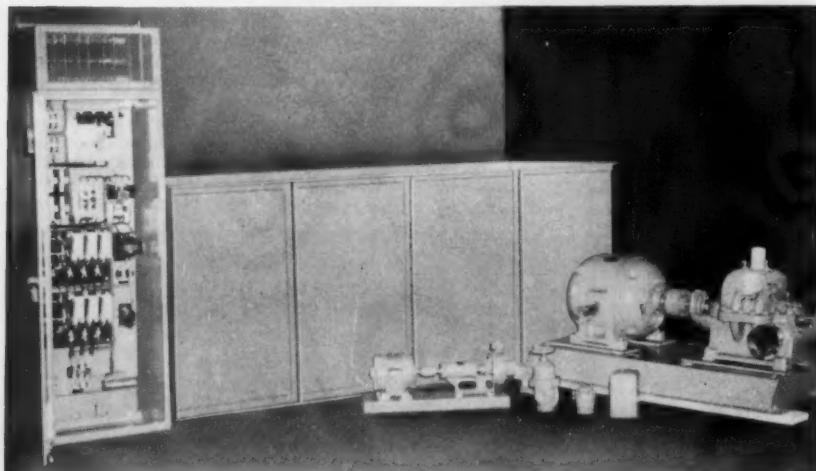
The planer is run at 0.200 inch feed per stroke, 100 s.f.m. and a $\frac{1}{4}$ inch depth of cut per pass. Before the change was made the feed was 0.100 inch per stroke at 60 s.f.m. with a $\frac{3}{16}$ inch depth of cut per pass. About $\frac{5}{8}$ inch of stock is removed in the planing operation.

One table top is planed with each of the eight cutting sides of the insert, where formerly the cutter had to be reground after one-fourth of the table top had been planed. For more data circle 3 on Postpaid Card

Giant Coolant System for Trepanning 20-Foot Holes

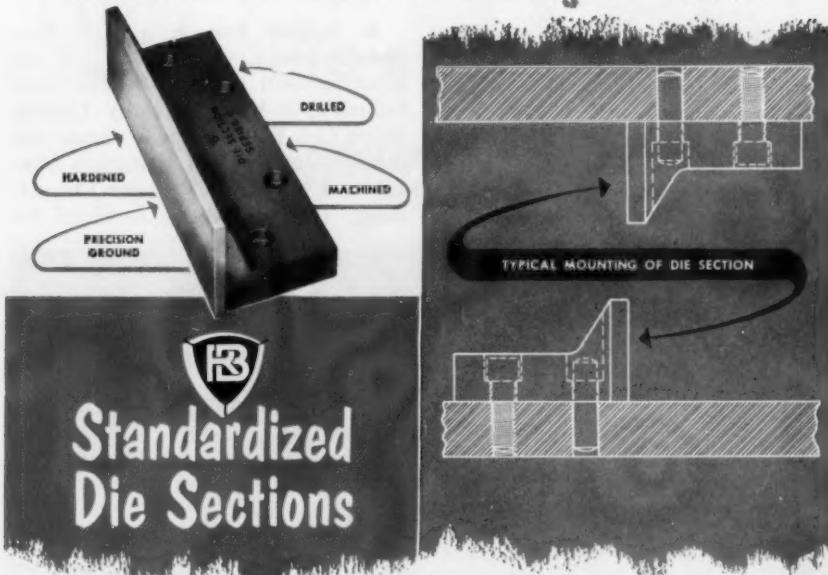
To meet the demands of larger operations, an unusually large high pressure coolant system has been constructed by Madison Industries, Inc., Muskegon, Michigan.

This particular system was developed for use with a Model 2500 Monarch Engine Lathe to be used for trepanning holes up to 20 feet in depth. It is claimed that this is the largest unit ever built for this purpose. A huge reservoir tank, with a capacity of 1,100 gallons, has been installed beneath the floor. The system is capable of delivering 150 g.p.m. at a pressure of 300 p.s.i. The coolant is circulated by a two stage pump driven by a 50 h.p. motor, operating at 3,500 revolutions per minute. Pump is equipped with Allen-Bradley starter with nema-standard enclosures. The



The giant high pressure coolant system has a 1,100 gallon tank below floor level.

Reduce Your Die Building Time...



Standardized Die Sections manufactured by R-B eliminate all of your machining, drilling, hardening and grinding. For, these die sections are entirely prefabricated and ready for mounting on your die shoes . . . they will substantially reduce your die building time.

Series A, B & C die sections have cutting edges of tool steel which are hardened and precision ground. Bases are of mild steel to permit drilling of dowel pin holes.

Series AA, BB & CC die sections are not hardened, have wider lands and are of the same general construction as series A, B & C. These extra wide lands permit contouring before hardening. Die sections in both series are available in various lengths and heights.

TOOL STANDARDIZATION is the basis for saving production time. With R-B you get the accepted standard of the sheet metal industry—in standard design features that save in engineering, die construction and operation.

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March, 1958

modern machine shop 151

More Production . . .

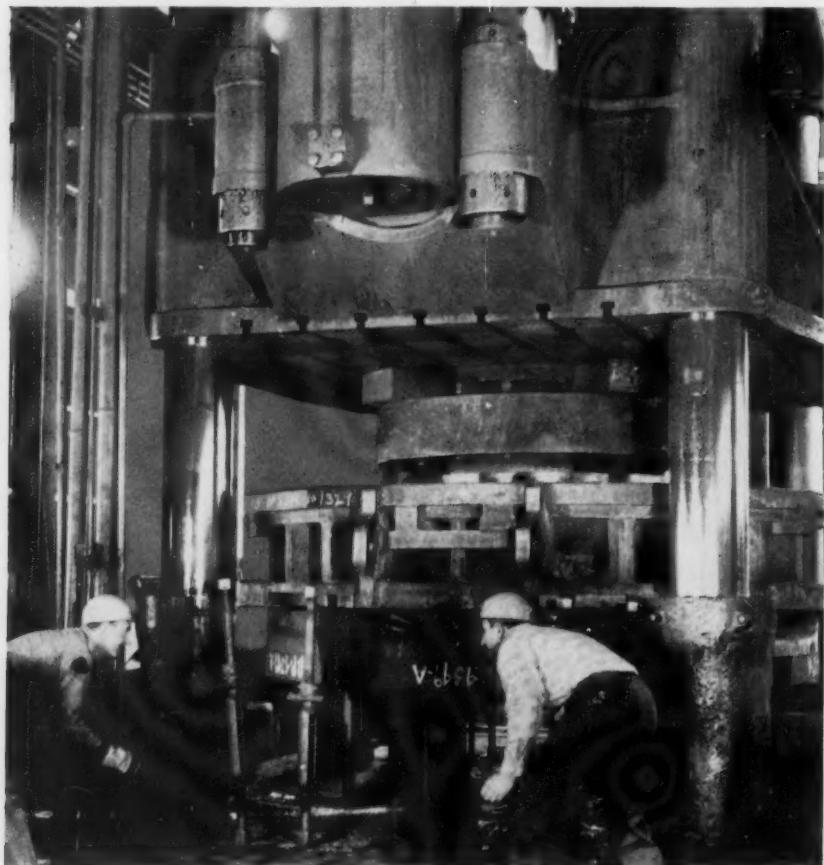
coolant returned from the machine sump is cleansed by being passed through a 100 micron filter before it is recirculated.

A large trepanning inductor designed and engineered by the same company, completes the system.

For more data circle 4 on Postpaid Card

Forming Nose Cones for Missiles

A 2,000 ton four-post hydraulic press, said to be one of the most modern facilities in the steel industry, is being used by Lukens Steel Co. to form nose cones for missiles for General Electric's Missile and Ordnance Systems Department. The nose cones, destined for



Nose cones for Atlas and Thor missiles are being formed between the jaws of 2,000 ton press.

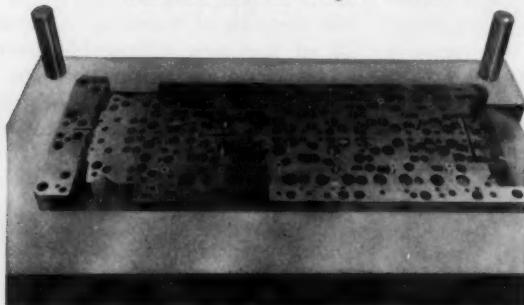


H LES JIG GROUND with

Vulcanaire



Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



Borrow our
instructive
11 minute
movie on
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A seven station die from Vulcan's contract Tool Room . . . Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

*Vulcanaire equipment pays for itself on the first job.

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710 LORAIN AVENUE • DAYTON 10, OHIO



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More Production . . .

the Air Force's Thor, 1500 mile, and Atlas, 5000 mile, ballistic missiles, enclose the nuclear warheads on the missiles in flight. They must withstand the extreme heat and shock encountered when the missile re-enters the earth's atmosphere at supersonic speeds.

The press is versatile as well as big. Recently between nose cone pressing assignments, what is claimed to be the largest head ever pressed was produced on the massive press. Made of carbon steel, the hemispherical head was almost seven inches thick.

For more data circle 5 on Postpaid Card

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Adjustable Harness Board Solves Assembly Problem

A stepped-up production schedule at the Friden Calculating Machine Company plant called for more workbenches in a space that was already overcrowded. The workbenches in use were large and somewhat unwieldy; they also necessitated the assembler standing on her feet an average of seven hours a day for seven days. The final electrical assembly on which the woman worked could only be mounted in certain, limited positions and the easles were fixed at 30 degrees. All of these factors, plus the slow-down resulting from the assembler being able to work from only one position, resulted in a considerable amount of non-productive actions and a loss of time.

With a Wilton PowRarm Work Positioner as the basic unit, an adjustable harness board was developed that enables the operator to slant the board at any angle she desires. She is thus able to position her work according to the actions involved in her assembly. This feature is said to be particularly valuable when working in hard-to-reach places.

The harness board is on an adjustable floor stand similar to an artist's easle and the platform has 360 degrees of rotation. A total of 24 of the new adjustable harness boards is now being used in the identical working area in which 18 of the old style workbenches were formerly used.

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Adjustable harness board enables operator to slant electrical assembly at any angle.

Brehm
trimmed
in one
press stroke

Slow, costly, multiple "horn" operations and distorted edges due to "pinch" trimming can be eliminated by a Brehm Die. Operating on principles different from ordinary trimming methods, the Brehm "Shimmy" Die with angular cams causes the shearing edges to cut four ways in a single press stroke.

Materials, thickness, shapes and sizes look alike to a Brehm "Shimmy" Die. Shells can be trimmed that are drawn from sheet gold, silver, stainless steel, mild steel, copper, brass, zinc, aluminum, fiber and the flash from some types of moulded articles made of rubber and similar material. Metal



thickness varying from .005 brass to .250 steel can be trimmed. Shell sizes vary from metal ferrules for fountain pen barrels to electric refrigerator doors. Clean, flat, burr free edges are assured. Edge contours can be straight or curved, with multiple notches and projections.

When model changes alter the part design, or if you wish to handle an entirely new part, you only need to substitute cutting adapters.

Send part prints to your tool room in Dayton for quotation on Brehm "Shimmy" and related dies, such as blank, form, pierce.



ENGINEERING • PROCESSING • BUILDING • TOOLS
DIES • SPECIAL MACHINES • VULCANAIRE JIG
GRINDERS • MOTORIZED ROTARY TABLES • BREHM
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BREHM DIE DIVISION • 732 LORAIN AVENUE • DAYTON 10, OHIO

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March, 1958

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VULCAN
tools

More Production . . .

Die Lubrication Increases Forging Output

Proper die lubrication, using a special compound designed for heavy-duty hammer forging operations, is aiding production at Steel Improvement & Forge Company, Cleveland. One of these lubricants is Thermex C-35 compounded by D. A. Stuart Oil Company, Ltd., Chicago, especially for work on stainless and titanium alloys. The job illustrated involves the forging of landing gear struts for the new commercial jet airliners.

Improved metal flow in the die and reduced sticking are cited as benefits of Thermex C-35 by pro-

duction executives. Forging billets used on this job weigh about 1,800 lbs. and are heated to forging temperature in large gas furnaces. They are carried to the forging hammer by a special tractor equipped with a large remotely controlled work-handling claw. Giant 35,000-lb. Erie steam hammers drop forge the hot S.A.E. 4340 metal into landing struts in a total of four separate operations. Two heats each are required for blocking and two more for finishing operations.

For more data circle 7 on Postpaid Card

★ modern machine shop ★

Metal Cutting Tool Nomenclature. Published by the Metal Cutting Tool Institute, 405 Lexington Ave., New York 17, New York. 107 pages, $8\frac{1}{2}$ by 11 inches. Paper binding. Price, \$4.50.

This is one of the most useful books to come across our desk in a long time. It is not alone useful to the man in the shop but to purchasing agents, tool designers, salesmen or anyone else who come into contact with cutting tools in any way. In addition it can serve admirably as a training aid in shop or apprentice training programs.

A reference book, this was not designed to be read straight through, but it is interesting enough to be so used. It is profusely illustrated with clear pictures.

Each section is divided into three parts. The first deals with the basic nomenclature of the tool types. The second illustrates the types and the third section defines all terms usually used in describing the various characteristics of the cutting tools.



Landing gear struts for commercial jet airliners are produced in 35,000-lb. Erie Steam hammer at Steel Improvement & Forge Co. Stuart Thermex C-35 is swabbed on dies to aid metal flow and reduce die sticking.



TOOL CONTROL SYSTEM

Now, from Seibert, you can obtain tool control boards that are individually designed to suit your production requirements. Panels are subdivided into sections for each type of tool, and divisions are arranged as required with space for two sets of tools for each job. Tool panels and benches are available in 3, 6, 9 or 12-foot lengths. In addition, you can now obtain from Seibert pre-setting gages of all types and also optional equipment such as plastic cyclometer covers with locks, drawers, shelves, etc., to suit your specific needs.

INCREASES PRODUCTION EFFICIENCY

Tool Control Boards are a tested and proven method of increasing the efficiency of production machine tools. They provide a system of scheduling tool changes according to pre-determined efficiency standards. You cut down-time, insure longer tool life, reduce tool breakage, and lower scrap losses.

SUMMARY OF ADVANTAGES

- Reduces down-time, provides an efficient system of programming tool changes.
- Automatically controls machining operations; provides visual record of used life of each tool.
- Assures more efficient use of tools, reduces breakage and scrap losses.
- Provides storage and complete facilities for presetting tools at the machine.

WRITE FOR COMPLETE DATA

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**EX-CELL-O LAPPING MACHINES DELIVER
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Ex-Cell-O Lapping Machines eliminate out-of-line, out-of-round and incorrect angles in centers. Result: Guaranteed accuracy in subsequent machining, scrap is cut by a healthy margin. Built by Ex-Cell-O, these machines deliver precision with ease. Remember, don't scrap—center lap—write for Bulletin 40271—or, better yet, call your Ex-Cell-O Representative.

Center Lapping corrects inaccuracies, assuring precision in subsequent operations between centers.



EX-CELL-O FOR PRECISION

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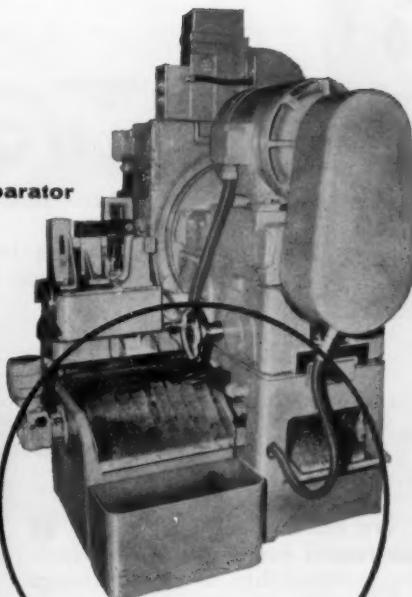
MANUFACTURERS OF PRECISION MACHINE
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57-13

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BARNESDRIL Magnetic Separator

easily adapts to
machine design,
saves cost of
piping, troughs
and tanks



No. 4 Separator with redesigned
housing shown as original equipment
on Double Disc Grinder.

This installation shows the flexibility of Barnesdril Magnetic Coolant Separators as applied to different types of machine design. A standard No. 4 Barnesdril Separator is used, and the housing extended to the floor. The Separator is hooked directly to the machine discharge and intake, and coolant flows through the separator into the reservoir in the base of the machine.

As a result piping, troughs and outside tanks are eliminated and the separator appears as an integral unit of the machine.

Inherent design of Barnesdril Separators and Filters lends itself readily to integrating with general machine contours, yet permits easy access and maintenance. Cost savings are realized in the elimination of piping, troughs and outside tanks.

New design data

Barnesdril engineers have compiled design data and specifications for adapting separators and filters to various types of metal cutting machine tools, and will be glad to supply information on any particular installation. This bulletin will also show you types of systems and installation. Write for a copy!



FILTRATION DIVISION



BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 13121 Puritan Avenue

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ideas
from
readers

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

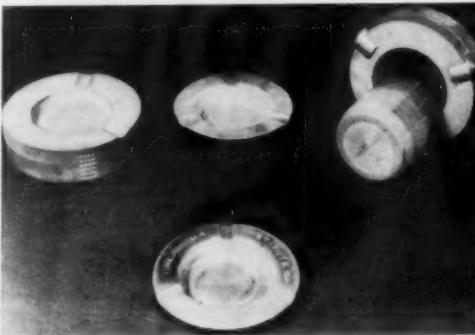
Hardwood Dies Used to Check Design

By H. J. GERBER

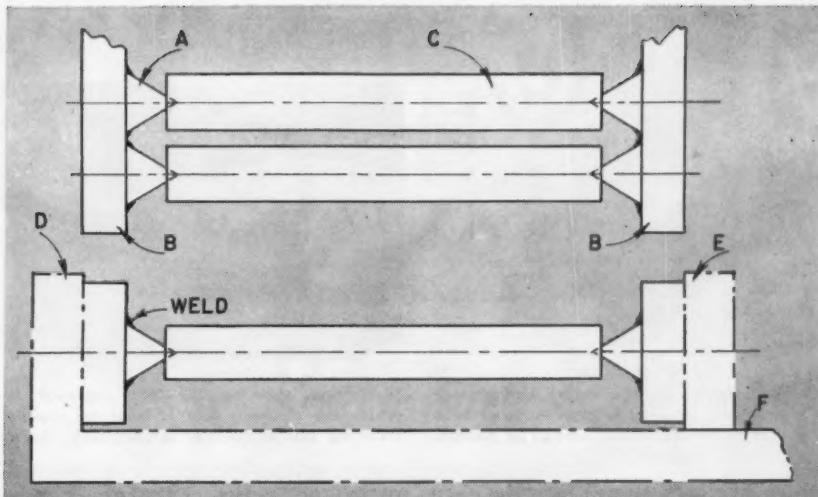
We sometimes make use of **hardwood forming dies** to check the practicability of certain design details before making the dies from steel. An example of this practice is shown by means of the accompanying illustration, which pictures a wood forming die, punch, and pressure plate. The design involved is for a souvenir ash tray which was to be produced in quantity from soft aluminum blanks. The slightly crude but adequate test piece made from the wood die is shown in the center of the upper portion of the illustration, and the finished ash tray produced by the subsequently built steel die is shown in the lower portion of the illustration.

In this particular design it was desired to prove out the feasibility of forming the three troughs in the tray rim simultaneously with the drawing of the depressed cup in the tray. One designer maintained that such a design would produce serious wrinkles in the drawn cup be-

low the flat rim. If this would be true it would mean the use of an extra die or resorting to a compound die design, both of which would increase the tooling expense. The economically built experimental die, made from seasoned hard maple, proved the feasibility of the simpler design and the same basic principles were then followed in building the permanent steel die.



Hardwood die is shown in upper right-hand corner of illustration; punch and pressure plate in upper right-hand corner. Test stamping made from wood die is between die sections. Final product produced with steel die designed with same principles as wood die is at lower center of the illustration.



Sketch of center-type work-holding fixture for use in grinding flats on round stock.

Fixture for Grinding Flats on Round Stock

By ROBERT HILL

Recently, we had a job in our shop that required flats to be ground on a number of round rods $\frac{5}{8}$ inch in diameter. To handle this job, we devised the fixture shown in the accompanying sketch, which enabled four rods to be ground in one operation.

The fixture consists of eight 60-degree centers, A, which are welded to two braces, B, made from $\frac{1}{2} \times 2$ -inch stock. Four centers are fastened to each brace, the centers being spaced to suit requirements. The workpieces, C, to be ground are center drilled at each end to accommodate the points of the centers, A.

To use, the fixture is placed between the jaws, D and E, of the

vise, F, and the centers, A, are aligned with the center holes in the ends of the workpieces, C. The jaws of the vise are then closed on the fixture, clamping the workpieces firmly for grinding. Short lengths of thin wall tubing can also be held for machining with this fixture.

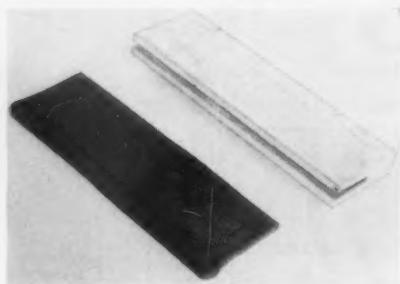
★ modern machine shop ★

Magnetic Chuck Cleaner

By IRA S. ROBERTS

For removing coolant and swarf from the surface of a magnetic grinder chuck, we devised the simple cleaning tool shown in the accompanying illustrations. This flexible scraper consists of a short piece of hardwood and a strip of used leather machine belting. The length of belting is fitted into a slot

ideas from readers . . .



Simple magnetic chuck cleaning tool consisting of a strip of used leather machine beltting that is fitted into a hardwood handle.

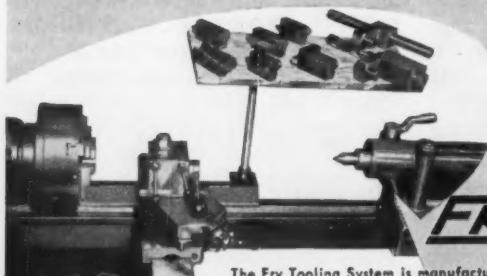


Illustration showing the easy manner in which the cleaning tool is used for readily cleaning the surface of a magnetic chuck.

which has been sawed into the edge of the piece of hardwood. The beltting can be secured in place by several short nails or wood screws. Our

experience indicates that this handy magnetic chuck cleaning tool is not adversely affected by any type of cutting oil or grinding fluid.

NOW YOU CAN HAVE . . .



**SPEED, ACCURACY,
RIGIDITY, VERSATILITY,
UNLIMITED OPERATIONS**

WITH

**FRY
MULTI-DUTY
TOOLING SYSTEM**

The Fry Tooling System is manufactured in 11 different sizes with 30 different types of Tool Adapters. Adapter changes are made quickly and accuracy is assured by hardened and ground rest buttons.

The Fry-Vi-Bra-Damp Boring Bar will eliminate vibration and chatter that you now have on standard boring operations. This scientifically constructed and proven boring bar will be the answer to your chatter problems.

Exclusive representation available in some localities

FRY

**TOOL MFG. CO.
EATON, OHIO**

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look out!"

"Production engineers who specify or influence the purchase of metalworking lathes for industry know that jamming of a lathe carriage or tool can cause costly gear breakage and flying metal. But it does happen.



"What I didn't know was that only one company—Logan Engineering—makes 12" screw cutting and turret lathes that include a built-in automatic safety gear as standard equipment. At the instant of overload, the safety gear disengages, guarding against damage in the train of gears from spindle through gear box.

"We not only save maintenance by using this fine Logan 12" lathe with its 38 to 1400 rpm variable speed drive and no manual belt shifting. We get 'built-in' insurance against heavy repairs and production slow-downs—for a lower price!"

NOTE: The above features are standard equipment, too, on Logan 14" screw cutting models (variable speed range, 38 to 1200 rpm). On all Logan 11", 10" and 9" lathes, automatic safety gear is optional.

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BEFORE YOU LEAP**

**LOGAN AUTOMATIC
SAFETY GEAR** ➤



Logan 12" Swing Lathe

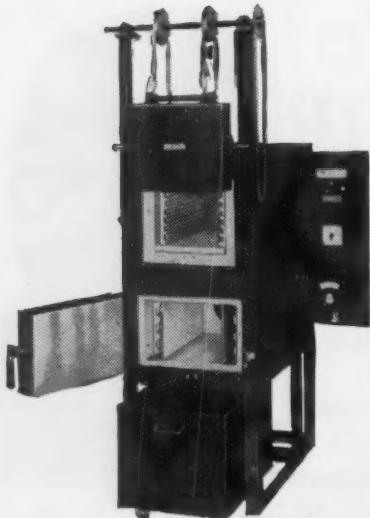
The Logan line includes lathes from 9" swing and 17" between centers to 14" swing and 40" between centers. Also 8" shapers.

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Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F. Quench tank included with the exception of the largest standard model.

Chamber Size		Prices				
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6"	x	6"	x	12"	\$ 865.00	\$ 975.00
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12"	x	12"	x	24"	1850.00	1950.00
18"	x	18"	x	36"	2750.00	2875.00

* Also available up to 1250° F.

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes — top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

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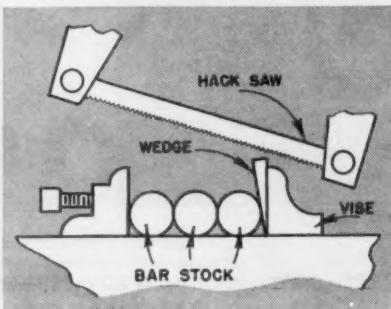
ideas from readers . . .

Vise Wedge Facilitates Round Bar Cutting

By H. LANDAUER

For firmly holding three or four round bars in a vise for cutting with a hack saw, we use the simple method shown in the accompanying sketch. By simply placing a wedge with the thick end up between the vise jaw and the first bar as shown, we can safely cut through three or even four round bars simultaneously without danger of hack saw breakage.

If four or five bars are being repeatedly cut on a production basis, it is advisable to use a wedge on each side of the work, with at least one of the wedges having the same width as the vise jaw. This full-width wedge (or both wedges if desired) can be fastened to the vise jaw in such a manner that it will remain in position when either unloading and reloading the vise.



Sketch showing simple method for firmly holding several round bars in a vise while simultaneously cutting with hack saw.



*There's a Standard **PUTNAM** **END MILL** for Your Job!*

Universal Application of Putnam End Mills (there are over 1700 standard sizes and types) permits users to select a standard end mill specifically designed for each job. Many standard Putnam End Mills are of a type considered "specials" by other manufacturers. Also, a wide range of sizes are available in every standard type of end mill to provide complete application coverage.

From smallest to largest sizes — from fine intricate machining to rugged milling operations there is probably a standard Putnam End Mill that will mill your job more efficiently. However, Putnam will also produce "special" end mills to your specs for those extra-special applications.



PUTNAM

TOOL COMPANY

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March, 1958

modern machine shop 165

DR. DOODLES

by ROGER PRICE



O
E. E.
M. E.
Ph. D.

"THREE DEGREES BELOW ZERO"

As a man who has steadily shunned all degrees except honorary ones (I'm still waiting for somebody to speak up) I feel well qualified to discuss the subject. And even though I myself am a prominent scientist—Sec'y-Treas. of the Lower Bronx Astronautical Society—I must admit I don't think degrees are very important. Of course, my viewpoint might change. Especially if I can wheedle some college into awarding me a Ph.D. (Phenomenal Droodlist). Ah, well, who can tell what the future will bring?

One thing the future is sure to bring is the increasing use throughout industry of the J&L Optical Comparator. This is an ingenious instrument which measures and inspects all sorts of parts and objects laterally, vertically and angularly—it also inspects by reflection, by tracing and from overhead—with speed and precision (to .0001").

The photo above shows how a J & L Comparator is used by National Seal Division of Federal-Mogul-Bower Bearings, Inc., Redwood City, Calif., to inspect and measure high precision rubber moldings. Due to the flexibility and shrinkage of the parts, accurate measure-



ment can be made only by means of the Comparator. Using reflected light, the Comparator visualizes the actual manufacturing process. That is, the cross section inspection at 20X of the moldings themselves. Based on this inspection, the molds are approved. Periodically, as a check, production parts are measured and compared in contour to the same chart outline. Thus the Comparator acts as a monitor, and reduces scrap before it starts.

Jones & Lamson makes the Comparator in eleven models, ranging from a 7" Bench type to a 30" floor model. For complete details, send this coupon today.

----- "The originator of machine tool standards in optical inspection" -----

JONES & LAMSON

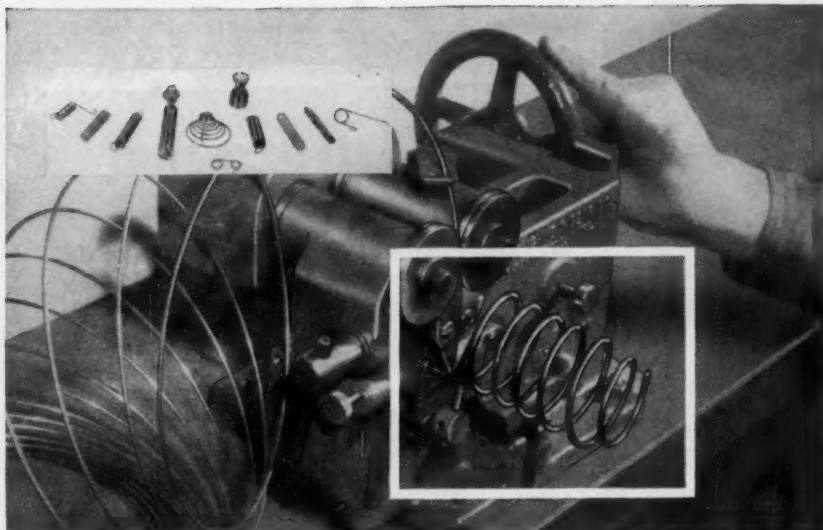
JONES & LAMSON MACHINE COMPANY, Dept. 710, 821 Clinton Street, Springfield, Vt., U.S.A.
Please send me Comparator Catalog 5700, which describes the complete line of J & L Optical Comparators.

Bench Model BC-7C



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Make any type spring . . . fast, exact! WITHOUT USE OF ARBORS

For a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with Perkins Precision Spring Coiler. You eliminate arbors, yet turn out precision springs — torsion, compression, extension, tapered, or special springs, coiled either left or right hand, in any desired length, any diameter from 3/32" to 12" and larger, with or without initial tension, and with

open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications as replacements or experimental work. Make them fast, right in your own shop!



Starrett adjustable jaw cut nippers (left) and Gardner Hook-Kon spring looping tool (center) — handy, precision, time-saving accessories for spring coiling. Perkins Spring Coiler available as bench model or power model shown here, (right) for tool shop or continuous runs.

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March, 1958



Perkins Machine and Gear Co.
Special Machinery Division, Dept. D1
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J and S Tool Co., Inc., 871 Dorsa Ave., Livingston, N. J. Expansion compensator and divided thrust live centers have self adjusting bearing take-up, correct capacity rating and are hardened and ground throughout.

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Grinding Machines

Arter Grinding Machine Co., 15 Sagamore Rd., Worcester 5, Mass. 8-page brochure on the complete line of Arter Precision Grinding Machines and the Jigmatic tape-controlled positioning table. Illustrated and described in detail are four models of rotary surface grinders, in chuck sizes from 8 to 40 inches, one model of a cylindrical-internal grinder and the new Jigmatic tape-controlled positioning table.

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Titanium Tubing

The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. "Present Status and Future Potential for Titanium Tubing." An 8-page article describes the involved method of producing titanium tubing and outlines briefly its many characteristics. It also explains why titanium tubing is uniquely immune to many corrosive conditions which have long been the number one problem of process engineers.

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Gang Vise Jaws

A. L. Derry and Sons Tool and Die Co., Pine Meadow, Conn. Equalizing Gang Vise Jaws give simultaneous 3-point holding for small parts varying in diameter. They allow fast, precision straight or gang machining.

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Abrasive Mounted Wheels

Bay State Abrasive Products Co., Westboro, Mass. General information with regard to grinding action, wheel markings, grade, bond types, abrasive types, structure, grain size, spindles and treatments are discussed. Specification recommendations are also included.

For more data circle 12 on Postpaid Card

Offhand Belt Finishing Materials

Behr-Manning Co., Troy, N. Y. An illustrated wall chart is being offered giving the selection of offhand belt finishing materials and equipment. Proper abrasives, grit, belt speed, lubricant and contact wheel are listed. Eleven types of contact wheels are described. Information includes types of surfaces, hardness and density, wheel action and the advantages of each type of contact wheel.

For more data circle 13 on Postpaid Card

Taps

Besly-Welles Corp., 108 Dearborn Ave., South Beloit, Ill. X-Press Taps form internal threads without cutting. Cold forms internal threads in metals, such as copper, brass, die castings, aluminum, lead, leaded steels and other ductile materials.

For more data circle 14 on Postpaid Card

Tumbling Media

The Carborundum Co., Electro-Minerals Division, P. O. Box 477, Niagara Falls, N. Y. Vest-pocket reference on tumbling media for superior barrel finishing. The folder describes and lists general applications for aluminum oxide tumbling nuggets, grain and vitrified tumbling pellets, as well as for "Carbo-Rubs"—rubber bonded tumbling media.

For more data circle 15 on Postpaid Card

a new way to Higher
honing Production
at Lower cost

announcing
**NEW FULMER
HONING MACHINES**

still priced far below competitive equipment!

- Greater Productivity
- Money-Saving Versatility
- Important New Compactness
- Traditional Fulmer Quality

TAKE the "ho-hum" out of bore finishing with a new Fulmer Honing Machine specifically designed to speed production and cut costs far below conventional grinding and bore finishing methods.

Now . . . more than ever before . . . new Fulmer Honing Machines are the answer for outstanding accuracy and production . . . at lowest cost! Send print of workpiece for a no-obligation estimate of time and cost savings that will amaze you. Also, get your FREE Fulmer Honing Computer. Just write: C. Allen Fulmer Co., Dept. S., 107 E. 4th St., Cincinnati 2, Ohio.



FULMER

Honing Equipment

For more data circle 420 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Blanking Press

The Minster Machine Co., Minster, Ohio. An illustrated bulletin describing Minster's 400 ton capacity 4OE-9 heavy material blanking press. Construction features which give the massive 4OE-9 its rigidity and tremendous power for blanking heavy material up to $\frac{1}{2}$ inch thick (or more) are shown in a cutaway diagram and explained in detail.

For more data circle 16 on Postpaid Card

Pumps and Pumping Units

Graymills Corp., 3769 N. Lincoln Ave., Chicago 13, Ill. Information relative to pumps and pumping units used for cleaning parts with solvents, flushing tubes and internal parts, circulating cleaning compounds and solvents to accelerate agitation, spraying conveyorized parts, manual spraying and flushing large parts, circulating and agitating abrasive slurries, circulating paint for dip tanks or flow coating and circulating and applying chlorinated solvents.

For more data circle 17 on Postpaid Card

Surface Grinders

The Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio. Bulletin available on Hill hydraulic surface grinders. Horizontal spindle, vertical spindle and extra heavy duty double housing models are included as well as special, precision "way" grinders. Grinder tables range from 8 to 40 feet in length.

For more data circle 18 on Postpaid Card

Taps

Horspool and Romine Manufacturing Co., Inc., 5850 Marshall St., Oakland 8, Calif. The Romine Single-Pass Acme Tap is described in this catalog. Finished, ready-to-use Single Pass Acme Taps are carried in stock in sizes from $\frac{1}{4}$ inch diameter to $2\frac{1}{2}$ inch diameter in thread pitches listed in the Federal Handbook H-28. Standard hardened blank taps suitable for special pitch threading are in stock.

For more data circle 19 on Postpaid Card

Turret Drilling Machines

Howe and Fant, Inc., 29 Fitch St., East Norwalk, Conn. Catalog illustrates the correct use of turret drilling machines on a wide variety of jobs and give actual production rates in each case.

For more data circle 20 on Postpaid Card

Magnetic Chucks

Hanchett Magna-Lock Corp., Big Rapids, Mich. Model CL chucks are absolutely moisture-proof and have a dependable shock-proof electrical circuit. Power consumption is equivalent to that used by a 50-100 watt light bulb. Model CL Chuck is complete with rectifier and built-in switch.

For more data circle 21 on Postpaid Card

Hole Cutters

Insley of Canada, Ltd., 2052 St. Catherine St., West Montreal 25, P. Q. Paralex adjustable hole cutters. Each cutter is supplied with one Highspeed Toolbit with cutting edge ground ready for use.

For more data circle 22 on Postpaid Card

Screw Driving Accessories

Magna Driver Corp., Dept. 92GI, 779 Washington St., Buffalo 3, N. Y. Current data on Magna (magnetic) bit holders, finders and sockets for all power screwdrivers, eliminate fumbleitis by firmly holding screws, bolts or nuts in assembly operations.

For more data circle 23 on Postpaid Card

Digital Index Table

Modern Engineering Service Co., 1895 Twelve Mile Rd., Berkley, Mich. A bulletin describing the point-to-point positioning Jacy Precision Digital Index Table. It is built to machine tool standards and features infinite resolution from 1 to 21,600 minutes of arc. A solid mechanical lock, with zero backlash, automatically engages in all index positions making possible repetitive accuracy to within 1 second of arc.

For more data circle 24 on Postpaid Card

Threading Tool

Mohr Tool and Manufacturing Co., Box 63H, Maywood, Ill. A catalog describing and illustrating a set of threading tools consisting of three precision made holders with 18 dies that will cut U.S.S. and S.A.E. threads and pipe threads.

For more data circle 25 on Postpaid Card

Keyway Cutter

John Oehrli, 343 S. Grier St., Williamsport, Pa. Keyway cutters cut straight or tapered, with only the initial job setup using this handy lathe attachment.

For more data circle 26 on Postpaid Card

Surface Grinders

The Blanchard Machine Co., 64 State Street, Cambridge 39, Mass. The No. 16-A Blanchard Automatic Surface Grinder grinds continuously with a wheel that is set and automatically maintained at a fixed height, and finishes one surface of the work to size in a single pass under the wheel. Four operations are necessary to assure the accuracy required. Cold rolled steel, stock per side: rough 0.014 inch—finish 0.0025 inch, limits plus or minus 0.0005 inch size. No. of sizes: 2 rough—2 finish, 235 pieces (940 surfaces) per hour.

For more data circle 27 on Postpaid Card

Levels

William B. Fell Co., 320 McLain Ave., Rockford, Ill. All-way precision levels are made in two standard sizes and in special types with graduations in degrees or thousandths.

For more data circle 28 on Postpaid Card

Die Set Accessories

E. W. Bliss Co., Die Supply Division, 1400 Brookpart Road, Cleveland 9, Ohio. A full line of die supplies available through Bliss-Dieco. Included are specifications and prices on hard steel drills, transfer screws, layout fluid, die rubber, oilers, hex head cap screws, lock washers, hexagon nuts, spherical washers, cast iron hand knobs, pry bars, and various types of screws and bolts.

For more data circle 29 on Postpaid Card

Magnetic Base Tools

Brown and Sharpe Manufacturing Co., Providence 1, R. I. New magnetic base tools and accessories—illustrated bulletin completely describes the Magnicator Junior, a line of magnetic base tools in two sizes, with variety of accessory lights, magnifiers and dial indicators for time-saving inspection and setups.

For more data circle 30 on Postpaid Card

Drilling and Tapping Accessories

Edlund Machinery Co., 32 Huntington St., Cortland, N. Y. Fully described and illustrated in this bulletin is the complete line of Edlund accessories for drilling and tapping machines. Included are lead screw tapping machine, the reversing motor tapping machine, precision clutch type tapping head, Edlund tee slots, coolant system, Edlund cam feed, table wear plate and table back-up bar, power elevated table, work light, turret depth stop, and so on.

For more data circle 31 on Postpaid Card

Collet Chucks

Detroit Cam and Tool Co., Ferndale 20, Mich. Absolute concentricity with micro collet chucks. Drill and spindle can be aligned accurately and quickly. Once alignment is made, it is not necessary to re-align chuck when new drills are used. Capacity—0.003 inch to 1/16 inch.

For more data circle 32 on Postpaid Card

Inspection Equipment

The Challenge Machinery Co., Grand Haven, Mich. Magnesium and aluminum precision inspection equipment for tooling, styling, model and pattern shops. Magnesium and aluminum universal right angle plates, magnesium and aluminum height blocks and pattern makers angle plates.

For more data circle 33 on Postpaid Card

Milling Machine

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Arbor-Loc spindle nose is now featured on knee-and-column milling machines with 50 series spindle. A variety of standard long arbors and adapters may be used interchangeably with the Arbor-Loc spindle nose type of arrangement.

For more data circle 34 on Postpaid Card

Air Chucks

The Cushman Chuck Co., Hartford, Conn. A complete line of air operated chucks, cylinders and accessory equipment. The catalog is divided into seven sections, each of which is step-cut to provide a quick reference to chuck or cylinder descriptions, dimensions, part lists, accessories, general information and other Cushman products.

For more data circle 35 on Postpaid Card

Cutting Tools

M. A. Ford Co., 1545 Rockingham Road, Davenport, Iowa. A bulletin describing catalog numbers, prices, cutting diameters, and length of tool is available. Tools covered include: Ford ground rotary cutters, countersinks, solid carbide end mills.

For more data circle 36 on Postpaid Card

Collets and Chucks

Gisholt Machine Co., Madison 10, Wis. This 23-page catalog includes information on collets and chucks and on power chuck wrenches, air cylinders and a section on special workholding equipment illustrated by job applications.

For more data circle 37 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Hole Grinder

Onsrud Machine Works, Inc., Portable Tool Division, 3924 Palmer St., Chicago 47, Ill. The D1-S Hole Grinder is designed for mounting on lathe, milling machine, jig borer or drill. Air turbine motor drive gives $\frac{1}{4}$ h.p. 50,000 r.p.m. grinding speed. A precision unit throughout with vernier scale for adjustment to 0.0001 inch. For grinding holes up to 2% inch diameter or up to 4 inches with adapter plate.

For more data circle 38 on Postpaid Card

Bending Machines

Pines Engineering Co., Inc., 644 Walnut, Aurora, Ill. Tube and rod end-finishing machines are designed for fast accurate work. Bench model, is designed so that forward travel of operating lever both clamps and feeds work to rotating cutters for simultaneous chamfering and facing. Operator always has one hand free for stock handling. Machine is equipped with quickly interchangeable toolholders and chuck inserts, 8-speed sheave (760 to 3,920 r.p.m.), sturdy spindle, precision bearings.

For more data circle 39 on Postpaid Card

Pocket Tools

Spring Speciality Co., 23 N. Fifth Ave., Maywood, Ill. Leigh pocket tools—No. 787 carbide and steel scriber. Points reverse for personal safety, approximately $\frac{1}{8}$ by $\frac{3}{64}$ inch diameter. Solid carbide rod brazed into steel permits regroundings.

For more data circle 40 on Postpaid Card

Transfer and Production Machines

The Producto Machine Co., 910 Housatonic Ave., Bridgeport 1, Conn. Rotary transfer and special production machines are illustrated and described in a 12-page booklet. Of particular interest is an automatic line transfer machine developed to perform three types of operations on a vee type crankshaft. The complete sequence of operations is detailed and illustrated. Illustrated also are three machines designed to solve special production milling problems.

For more data circle 41 on Postpaid Card

Twist Drills

Precision Twist Drill and Machine Co., 10 Woodstock St., Crystal Lake, Ill. Precision high speed twist drills made from 0.0059 diameter and up.

For more data circle 42 on Postpaid Card

C-Type and Straight Side Presses

The Precision Welder and Flexopress Corp., 3520 Ibsen, Cincinnati, Ohio. 8-page bulletin on the complete line of high-speed Precision Flexopress — both "C" type and straight side. Includes complete specifications on "C" type from 15 to 75 ton and on straight side from 75 to 200 ton. Gives description of Flexopress features, illustrations of all machines and examples of special tooling.

For more data circle 43 on Postpaid Card

Hole Punching Units

Punch Products Corp., Niagara Falls, N.Y. Included in this brochure are tooling cost comparisons, typical setups and mounting methods for presses and press brakes, typical notched and perforated angles, channels, extrusions and sheets, exclusive high interchangeability of standard parts between the various series of perforating units, and the standard and special units that comprise unitized tooling.

For more data circle 44 on Postpaid Card

Height Gage

George Scherr Co., Inc., 200 MM Lafayette St., New York 12, N.Y. Tumico Optic Vernier Height Gage has single pushbutton which frees for initial adjustment. Convenient knobs, located on base and on top of gage post, provide fine 100 to 1 ratio adjustment of full length drive. Lock knobs on either side of jaw provide for quarter turn solid locking of jaw to beam.

For more data circle 45 on Postpaid Card

Jig and Fixture Components

Northwestern Tools, Inc., 119 Hollier Ave., Dayton 3, Ohio. This current catalog covers over 400 components of jigs and fixtures, and over 200 clamping items. The catalog includes a scale size tracing template of the jig and fixture components.

For more data circle 46 on Postpaid Card

Drill Jig Bushings

Ex-Cell-O Corp., Detroit 32, Mich. A complete line of A.S.A. and Ex-Cell-O Standard Drill Jig Bushings. This incorporates aircraft type bushings, offering a larger range on lengths and o.d. sizes in press-fit types; a new 5/32 inch o.d. group of press-fit bushings with holes as small as 0.0152 diameter; a new $\frac{1}{2}$ inch length added to the $\frac{1}{8}$ inch.

For more data circle 47 on Postpaid Card



You can handle ultra-precision work like this with an investment of less than \$1,000. Ask for a free demonstration.

Dia. range of standard honing tools: $\frac{1}{8}$ " to $2\frac{1}{8}$ "

THE VALVE THAT MUST NOT FAIL

This stainless steel valve body is the heart of an air gage tracing unit for a precision lathe. The bore must be perfect.

The lands, slots and ports cause distortion and bow during heat treatment. Internal grinding did not produce the accuracy required for the long hole. Grinding and lapping also caused washout at the ports and slots.

Only Sunnen Honing handled the complete job successfully.

The long rigid honing tool bridges all irregularities... generates a true bore with a straight axis. No localized pressure... no deflection. Results: Guaranteed accuracy, geometric roundness and straightness of the bore.

With Sunnen Honing Tools there's no loose abrasive to cause washout. And precision graded honing stones—made under strict quality control—assure consistent performance and exact surface finish part after part.

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PRODUCTS COMPANY
HONING

7024-D Manchester Ave., St. Louis 17, Mo.
Canadian Factory: Chatham, Ontario 7745

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Lathes

The Monarch Machine Tool Co., Sidney, Ohio. A catalog describing the line of Series 62 Preselector Dyna-Shift lathes. Twelve models in all—these lathes incorporate the exclusive Preselector Dyna-Shift headstock. This unit provides automatic spindle speed calculation, a wide 36 speed range—17 to 1,750 r.p.m., and finger tip hydraulic shifting. Accessory equipment, including Monarch-Keller contour controls and the air-gage tracer system, are presented.

For more data circle 48 on Postpaid Card

Countersinks

Schrillo Aero Tool Engineering Co., Los Angeles 46, Calif. Produced of high speed steel and heat treated to assure uniform hardness, these single-lipped countersinks come in 7 body diameters, each in a choice of standard 60, 78, 82, 90, 100, 110 or 120 degree angulations.

For more data circle 49 on Postpaid Card

Balancing Machines

Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. Information on the Dynamic Industrial Balancing Machines which are electronic devices consisting of the following basic components: Drive system, cradle, vibratory system, electro-magnetic, dashpot/pickups and electronic interpreter.

For more data circle 50 on Postpaid Card

Snagging Wheels

Simonds Worden White Co., 1101 Negley Place, Dayton 7, Ohio. Dayton Safety Snagging Wheels, for the removal of metal surface imperfections, are described in a 4-page bulletin. Illustrations show typical applications on small castings and steel slabs, and the available range of standard wheel shapes. A handy specification table includes sizes and types and specification code markings.

For more data circle 51 on Postpaid Card

Die Sets and Accessories

Standard Die Set Co., 1503 Elmwood Ave., Providence 7, R. I. Type "W" die set (diagonal post), open die sets (Meehanite), Type "S" die sets for transfer presses (Meehanite), open holders for press brakes (Meehanite), and so on. Accessories—precision dowel pins, socket head shoulder screws, hex socket set screws, socket head cap screws, die makers grease and so on.

For more data circle 52 on Postpaid Card

Internal Collets

Royal Products Co., 84 Union St., Mineola, N. Y. These internal collets fit all standard 5C draw bars, fixtures, grinders, and so on. Replaces arbors and makeshift gadgets. Pad has no linear movement. Shoulder can be used as positive reference. $1\frac{1}{4}$ inch o.d. machinable down to $\frac{1}{8}$ inch in diameter.

For more data circle 53 on Postpaid Card

Tool Services

Rutland Tool Service, 1617 E. McNichols, Detroit 3, Mich. Tool designers are experienced in engineering all types of high-speed and carbide cutting tools. A complete stock of standard catalog tools of quality is maintained.

For more data circle 54 on Postpaid Card

Chucks and Accessories

Supreme Products Corp., 2222 South Calumet Ave., Chicago 16, Ill. Jaws nickel chrome moly alloy steel—expertly heat treated for durability, key holes do not extend into body cavity thereby sealing out dirt, sturdy one piece geared nut construction, prevents slippage, entire chuck body hardened inside and out, taper bore hardened and ground, individually tested for accuracy, chucks and keys interchangeable with other makes.

For more data circle 55 on Postpaid Card

Heavy Duty Drills

Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill. A 4-page bulletin featuring Thor reversible heavy-duty electric drills. Specifications of the Thor "EN" series of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and 1 inch reversible portable electric drills. Also included are specifications of the "EL" and "EJ" electric drill series, screwdriver-nutsetters and impact wrenches.

For more data circle 56 on Postpaid Card

Cast Alloy

Vascoloy-Ramet Corp., Waukegan, Ill. Where and how to use tantung in the form of solid tool bits, tipped tools, cut-off blades, toolholder inserts and pre-formed tools and blanks, and for many wear applications are described in a 12-page booklet. Complete technical data covering tantung, a superior cast alloy comprised principally of cobalt, chromium, tungsten, columbium and carbon is included together with tantung cutting speed range information.

For more data circle 57 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Industrial Fasteners

Standard Pressed Steel Co., Box 556, Jenkintown, Pa. Industrial fasteners, including Unbrako socket screw products, Flexloc self-locking nuts, Sel-Lok spring pins and Hallowell steel collars.

For more data circle 58 on Postpaid Card

Electronic Comparator

Threadwell Tap and Die Co., Greenfield, Mass. Detailed information given on the Threadwell S. I. Electronic Comparator along with specifications and special features of this instrument which is used for quick, accurate on-the-job gaging to 0.00002 inch.

For more data circle 59 on Postpaid Card

Wire and Strip Forming Machine

The Torrington Manufacturing Co., 730 North St., Torrington, Conn. Feed mechanism—the feed gears permit a selection of 90 degrees or 180 degrees feed, with a maximum feed of 12 inches. Drive system—power is transmitted by vee belt to the fly wheel and thence through a clutch to the working parts. Presses—these operate like conventional punch presses with a ball-pitman design. Positive-return cams are used.

For more data circle 60 on Postpaid Card

Radial Drill

Veet Industries, 25753 Groesbeck Highway, East Detroit, Mich. Characteristic of the free swinging arm of the radial drill are accentuated in the Veet radial with a balanced arm and head that glides to hole locations on ball bearing rollers.

For more data circle 61 on Postpaid Card

Tonnage Calculator

Verson Allsteel Press Co., 9310 S. Kenwood Ave., Chicago 19, Ill. Slide rule for calculating tonnage required for bending and punching operations with Verson Press Brakes.

For more data circle 62 on Postpaid Card

Tool Grinder

Wesson Co., 1220 Woodward Heights Blvd., Ferndale 20, Mich. 6-page bulletin which tells how tool grinding departments can increase diamond wheel life; get more tool grinds per hour; obtain better finishes with unskilled operators; and how to cut tool grinding cost almost in half.

For more data circle 63 on Postpaid Card

Optical Pickup Attachment

Wales-Strippit Co., Akron, N. Y. Duplo-O-Scope, optical pickup attachment for punching templates direct from drawings or printed master circuits. This attachment is designed primarily as an accessory for any Strippit fabricator-duplicator, in punching electronic printed circuit boards, the unit also has applications for punching complex hole patterns in any sheet material to a capacity of $\frac{1}{4}$ inch in mild steel.

For more data circle 64 on Postpaid Card

Threading Tool

Warner Development Co., Rt. 3, Box 46A, Santa Fe, N. M. Current data on Spee-D-Thred—single point threading tool for reversing lathes.

For more data circle 65 on Postpaid Card

Straighteners

The Waterbury Farrel Foundry and Machine Co., Waterbury, Conn. Complete line of straighteners for flattening ferrous and non-ferrous coiled strip or sheet.

For more data circle 66 on Postpaid Card

Power Press

Wharton Unitools, P. O. Box 202, Valley Stream, L. I., N. Y. Arbo $2\frac{1}{2}$ tons baby motorized power press with automatic roller feed. Suitable for blanking, piercing, clipping, embossing and guillotining. Continuous runs fin strip or coil of light gage metals, plastic, film, cardboard, paper, wire and so on.

For more data circle 67 on Postpaid Card

Angle Iron Shear

Whitney Metal Tool Co., Rockford, Ill. Bulletin containing complete information on Whitney-Jensen No. 4 Angle Iron Shear capable of cutting 2 by 2 by $\frac{1}{4}$ inch stock. Also described are two allied tools, a bender and a notcher and how the three tools can be combined on one stand requiring a total floor space of 21-1/3 by 26 inches.

For more data circle 68 on Postpaid Card

Carbide Tools

Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich. Carbide tipped work support blades for multi-diameter, angular, form, tapered or radius grinding.

For more data circle 69 on Postpaid Card

news of the industry

**New plants and expansions . . .
mergers . . . acquisitions.**

Edited by R. M. SCHIFFER

HILL ACME CONSTRUCTS NEW RESEARCH BUILDING

The Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio, manufacturer of hydraulic surface grinders, abrasive belt grinders and polishers, billet and scrap shears, forging, threading and tapping machines, metal cutting knives and machinery castings, has announced the construction of a new research building. This building is purposely located separate and apart from the company's main manufac-

ting facilities so that development and experimental work can be conducted on new machines without interrupting the normal production schedule in the plant. The new building is serviced for the entire length of its 60 foot bay by a 10 ton pendant operated crane with a 16 foot hook clearance.

The purpose of this Research Building is to process representative quantities of customers' material, thereby establishing and proving technique, quality and production available on



The exterior of New Research Building, The Hill Acme Company, Cleveland, Ohio

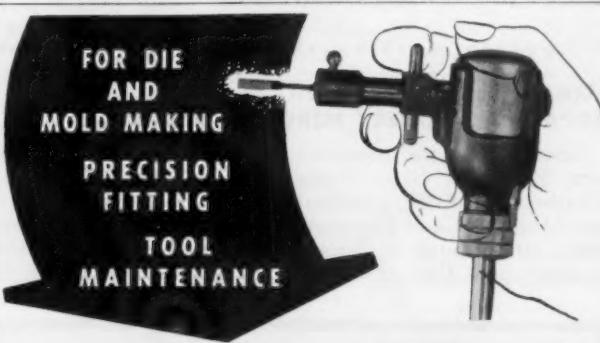
the Hill Acme Company's new type machine tools. At any time, the tools in operation in the new building might be changed in order to make room for new or varied machines that the company develops.

The tools presently operating in the Research Building are a 50 inch wide reciprocating-table type abrasive belt machine for grinding and polishing; a 60 inch wide continuous process pinch roll type abrasive belt machine for grinding and polishing; a new design 2 inch single-spindle HA threading machine; and one of the company's revolutionary new bar-billet shears completely automated with magazine and power feed table for giving square, accurate cuts of any required length at exceedingly high production rates. Other machines are currently in process.

So that all types of ferrous and non-ferrous material, some being inflammable, can be ground or polished on the abrasive belt machines, a special wet type dust collector is installed in the building. This collector can be connected by ducts to as many machines as may be necessary.

WHEELOCK, LOVEJOY MAKES CHANGES IN PERSONNEL

Wheechock, Lovejoy and Co., Inc., Cambridge, Mass., recently announced the following personnel changes: Frederick H. Lovejoy will continue as president and treasurer. A. Oram Fulton, Jr., has been promoted from vice president to executive vice president. Norman N. Brown, formerly district manager in Cincinnati, has been ad-



THE Di-Profiler

Flexible Shaft RECIPROCATING TOOL

Fast, accurate, versatile

For grinding, filing, scraping, honing, lapping, polishing — the Di-Profiler saves hours of tedious hand labor — especially on intricate, detailed, hard-to-get-at jobs.

Driven by flexible shaft, the machine is light, sturdy, free from vibration. The speed of reciprocation is controlled by foot rheostat and can be varied from 0 to 100 strokes per second; the length of stroke is adjustable from 0 to $\frac{1}{4}$ -inch.

for
ANY CONTOUR
or FINISH —
accessories
include
diamond files,
discs, points
and wheels;
scrapers, laps,
hones and
T-C cutters



Write for Free Demonstration or Illustrated Price List DS-38

ENGIS EQUIPMENT COMPANY
431 S. Dearborn St., Chicago 5, Ill.

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news of the industry . . .

vanced to the position of vice president and is located in the home office at Cambridge. Richard M. Powers, a member of the Cambridge sales department for many years, has been appointed district sales manager. John J. Humphreys, Jr., who will continue to be of direct service to the Cambridge customers, has been promoted to district manager of orders.

★ modern machine shop ★

**FEDERAL MACHINERY AND
BRYANT MACHINERY MERGE**

Spencer B. Booz, president of Federal Machinery Sales Company and Charles B. Tansley, president of Bryant Machinery and Engineering Company, both located in Chicago, recently announced that an agreement had



(Left) Charles B. Tansley, vice president, and (right) Spencer B. Booz, president, Federal-Bryant Machinery Co., Chicago, Ill.

been reached between these two machine tool distributor organizations on the merging of their operations.

Executive and sales personnel of both companies are being integrated into this combined operation, with offices located at 4639 West Washington Boulevard, Chicago 44, Illinois.

FREE NEW-16 PAGE CATALOG

WRITE FOR YOUR COPY TODAY

JIG AND FIXTURE COMPONENTS

Latch Bolts	Jig Feet (3 Types)
Cast Iron Hand Knobs	Spherical Washers
Aluminum Hand Knobs	Fixture Keys
Quarter Turn Screws	Knurled Head Screws
Shoulder Screws	Toggle Shoe Clamps & V-Pads

HOLD DOWN AND CLAMPING TOOLS

T-Nut & Stud Sets	Toe Nuts
Step Block & Clamp Sets	Coupling Nuts
Flanged Nuts	Adjustable Step Blocks
Cut Thread Studs	Strap Clamps (Plain & Step Type)

CATALOG INCLUDES TRACING TEMPLATES

Northwestern

119 HOLLIER AVE.,
DAYTON 3, OHIO

NORTH
WESTERN

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benchmasters

make 2-WAY savings!

Higher Operating Speeds

Lower Original Costs

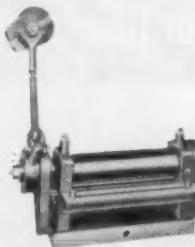
Benchmaster offers a complete range of machine tools—
at substantial cost savings over larger equipment.

Yet you make no sacrifice in quality or performance...
actually improve production! Write for
details on these proven tools!



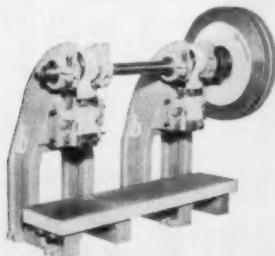
benchmaster KOIL-KRADLES

Supplies a slack loop from which
any machine can freely draw;
puts more footage through any machine,
eliminates heavy lifting.



benchmaster AUTOMATIC FRICTION ROLL FEEDS

Totally new friction spring clutch
now eliminates wear, maintains
accuracy on every stroke! Fits
most presses. 3"-6"-9" roll
widths, 0-3" cutoff or 0-6" cutoff.
Larger widths on special order.



benchmaster MULTIPLE RAM PRESSES

Substitute for a low cost SHEAR or
BRAKE with big savings.

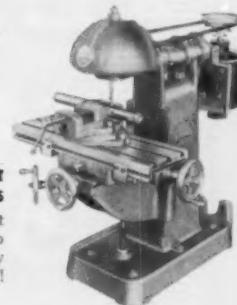
benchmaster PUNCH PRESSES

Benchmaster's higher crankshaft speeds
usually double production over large
slow presses! 2, 5, 8 and 10-ton
capacities, all press types.



benchmaster STRAIGHTENERS

Insures flat parts and better work
from every coil. (Note:
Koil-Kradles and Straighteners also
available as combination units.)
Optional: Electric Clutch & Brake.



benchmaster MILLING MACHINES

A real production mill that
converts from horizontal to
vertical milling simply by
exchanging spindle quills!

Write for literature and quotations. Dealers everywhere!

benchmaster

World's largest
manufacturer of small punch
presses and mills.

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news of the industry . . .

Federal-Bryant Machinery Company will be the name of the newly formed organization to be headed by Mr. Booz as president. Mr. Tansley will serve as vice president and sales manager of the Machine Tool Department and Mr. Harry A. Paine will be vice president and sales manager of the Small Tool Department. Mr. T.

G. Remsen is retiring as vice president of Federal and will continue with the Federal-Bryant Machinery Company as a consultant and director.

★ MODERN MACHINE SHOP ★

CARL E. LINDEN RETIRES

The Fosdick Machine Tool Co., Cincinnati, Ohio, recently announced the retirement of its president, Carl E. Linden. Mr. Linden has been associated with Fosdick since 1933 when he became general manager. He was made president during 1956, concurrent with the company's purchase by The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.

Associated with the machine tool industry for more than 42 years, it is claimed that Mr. Linden has been identified with significant tool developments over the years. Working with IBM, Mr. Linden



Equipto

606 Prairie Avenue
Aurora, Illinois

Write for free catalog No. 202

For more data circle 424 on Postpaid Card



Carl E. Linden

SIMONDS
ABRASIVE CO.

CUT-OFF WHEELS

for **FAST,**
CLEAN-CUTTING
on **ALL** materials

Resinoid bonded to stand up to the rigors of high-speed grinding! Rubber bonded for wet or dry cutting under severe stress and strain! Simonds cut-off wheels, in either bond, save time, money and materials with speedy, accurate cutting. You can also eliminate finishing operations due to their clean-cutting action. All standard sizes. Drive pin holes furnished as required with rubber bonded wheels.

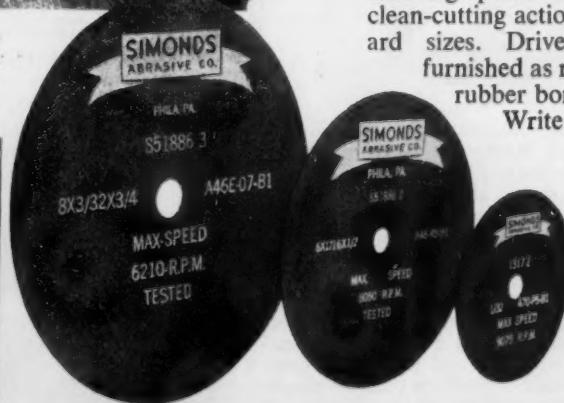
Write for bulletin
ESA 163.

For all metals, including hard alloys, and non-metals except wood.



CALL YOUR SIMONDS
DISTRIBUTOR

- P**roven products
- D**ependable know-how
- Q**ick supply



SIMONDS ABRASIVE COMPANY

Tacony & Frankford Sts., Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: Chicago • Detroit • Los Angeles • Philadelphia
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for as little as
\$22.00
 COMPLETE
IN U.S.A.

For This Production Boosting
"TRICO-MIST"
COOLANT SYSTEM

With Flexible Armored Coolant Lines
 And Kwik-Change Nozzle



For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers—single or multiple outlets—single or dual valve control.

SEND FOR BULLETIN 37

TRICO FUSE MFG. CO.
 MILWAUKEE, WIS. U.S.A.

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news of the industry . . .

recently developed the world's first totally automatic jig borer, entirely controlled by tape or card. In recent years he has also developed a precision jig grinder which accommodates larger work than previous machines, and a new radial drill which features new and simpler operator control. Earlier in his career, he was chief engineer of the Cincinnati Planer Company, Cincinnati, where he developed an open-side planer and a combination planer and milling machine believed to be the first of its kind. He later served as sales manager. Mr. Linden has been an active member of the National Machine Tool Builders' Association for many years.

★ modern machine shop ★

**HAMMOND INTRODUCES
 DEMONSTRATING "BUS"**

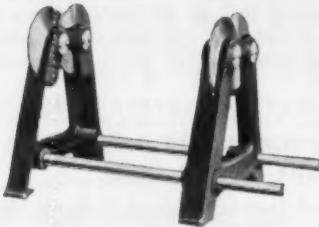
To demonstrate its electrolytic carbide tool grinders and electrolytic chip breaker grinder, Hammond Machinery Builders, Inc., Kalamazoo, Mich., has put on the road, a completely equipped "Bus." The grinders are connected to an anicut power pack, and the mobile demonstrator carries its own generator, thereby making it unnecessary to connect to an outside power source.



View showing bus used for demonstrating.

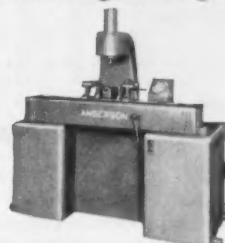
Anderson High Production Tools **CUT PRODUCTION COSTS**

Precision Balancing Ways



Balance rotating parts easier, faster, more accurately. No leveling or centering required. Five sizes 20" to 96" swing, 1000 to 20,000 lbs. Precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings.

Hydraulic Straightening Presses



Straighten and check in same location with both speed and accuracy. Available with either traveling or stationary ram, power or hand operated in capacities up to 10, 25, and 50 tons. Can straighten to within .001."

Improved Hand Scrapers

Both high-speed steel and carbide-tipped blades in 18", 20", or 22" lengths. Light in weight, easy to use, reduce need for costly regrinding. Rubber bumper available for comfort and convenience.



Anderson Power Scraper

Power Scraper has a "natural hand control." Forward stroke can be regulated from $\frac{1}{4}$ " to $3\frac{1}{2}$ feet at 60 feet per minute. Portable, may be plugged into any electric outlet.



Write for Bulletin No. 3-22

ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

For more data circle 427 on Postpaid Card

news of the industry . . .

It is claimed that the electrolytic grinders provide the easiest and fastest grinding of carbide tools ever experienced; reduce consumption of diamonds; greatly reduce operator fatigue; and substantially increase production. Another important feature of the electrolytic method, the company states, is cool grinding which prevents cracking of tools.

★ modern machine shop ★

MOHAWK TOOLS, INC. DOUBLES MONTPELIER PLANT

Mohawk Tools, Inc., Montpelier, Ohio, producers of Subland cutting tools, is in the process of completing its building program which is said to have doubled the size of its existing and relatively new manufacturing plant.

The new addition, a single level building, scheduled for completion and production use in 1958, will house precision manufacturing facilities for the fabrication of size-optional and special Subland tools.

The increase in plant area enables Mohawk to both expand and speed its production facilities, increase its off the shelf storage inventory of the size-optional tool system and improve its shipping service. Along with the existing physical growth, Mohawk is enlarging its tool and engineering design services as a practical and educational assistance to the industries.

★ modern machine shop ★

VEET INDUSTRIES INTRODUCES MOBILE RADIAL DRILL

Veet Industries, East Detroit, Michigan, has recently inaugurated an idea designed for the purpose of stimulating the sale of its new model radial drill.

NOW...

THE MOST RUGGED and Most Accurate HEIGHT GAGE MADE!

Delicacy or fragileness no longer need be associated with accuracy! The new PROTECTOR Gage Tip* provides complete protection against BLOWS FROM ALL DIRECTIONS—even head-on—and the Cleveland INDI-AC Electronic Height Gage still remains accurate to MILLIONTHS of an inch.

An accidental blow, due to handling, or mistake in set-up, merely deflects the Gage Tip instead of transmitting the blow and damaging the gaging elements.

Only available on new Cleveland INDI-AC Electronic Height Gages—or as a replacement for standard tips on INDI-AC'S now in service.

*Patent Applied For.

Cleveland INSTRUMENT COMPANY
735 Carnegie Avenue • Cleveland 15, Ohio

For more data circle 428 on Postpaid Card

**15% more torque from
the same air pressure
while consuming 30% less
air! It's the new**



Air impact wrench!

"Free as the air" is an expression which has little application to compressed air. Learn more about the truly remarkable efficiency of the new Sioux Air Impact Wrench.



**Unexcelled Performance and
Durability**

*It's
the*



Electric impact wrench

When it comes to electric impact wrenches, here is the maximum in dependable power per dollar. Available in $\frac{1}{2}$ " or $\frac{3}{8}$ " drive.



Spin nuts on or off without touching them . . . it's the new SIOUX

Pelican NUT ACCUMULATOR

Action of the impact wrench removes nuts and spins them up into the Pelican on a center stem. The stem will hold ten $\frac{3}{8}$ " or 13/16" hex nuts, either 7/16" or $\frac{1}{2}$ " thread. Reverse action spins the nuts back on. Stems can be removed with their load of nuts and empty stems installed in their place. Or, stems can be pre-loaded and placed in Pelican for assembly operations.

The Pelican may be used with any $\frac{1}{2}$ " or $\frac{3}{8}$ " square drive, air or electric impact wrench.



PELICAN
IN USE WITH
NEW SIOUX
AIR
IMPACT WRENCH CENTER STEM



ALBERTSON & CO., INC.
SIOUX CITY, IOWA, U.S.A.

NEW AIR IMPACT WRENCHES • NEW AIR SCREWDRIVERS • NEW "PELICAN" NUT ACCUMULATORS •
ELECTRIC IMPACT WRENCHES • DRILLS • GRINDERS • SANDERS • POLISHERS • SCREWDRIVERS
• PORTABLE SAWS • VALVE FACE GRINDING MACHINES • FLEXIBLE SHAFTS • ABRASIVE DISCS

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news of the industry . . .



Frank Snyder, New England representative beside Veet Industries' Mobile Radial Drill

On specially equipped Ford Rancheros, Veet has installed a low based standard 3-foot radial drill, completely enclosed in Plexiglass, which may be driven into any industrial plant desiring a demonstration.

The drilling machine is accessible through a sliding door at the rear, where steps permit easy access for drill operator and interested persons who desire to examine the Veet drill

in operation. The Veet Radial Drill can be easily put under power for demonstration with portable power cables carried with the unit.

A public address system has been installed for mass demonstrations, enabling the demonstrator to speak above plant noises, thus assuring a complete explanation as well as observation of the demonstration of the capabilities of the radial drill.

HARGRAVE *Individually
Tested* **TOOLS**

CLAMPS • CHISELS • PUNCHES

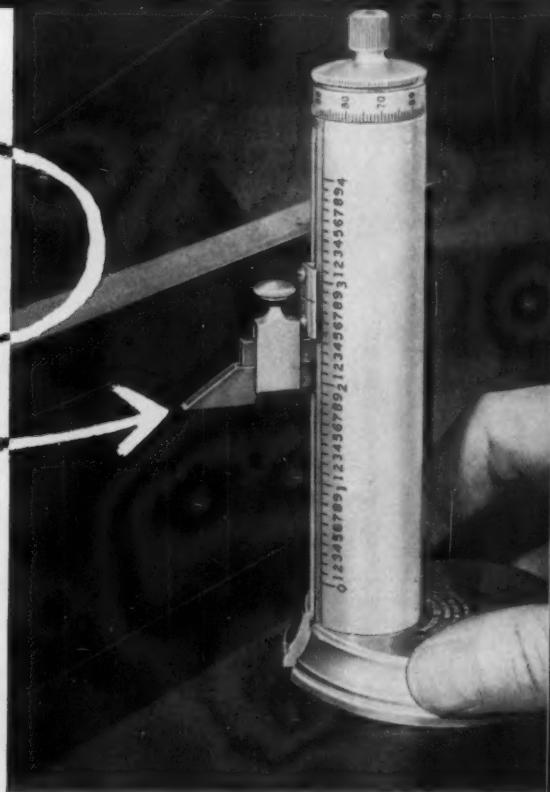
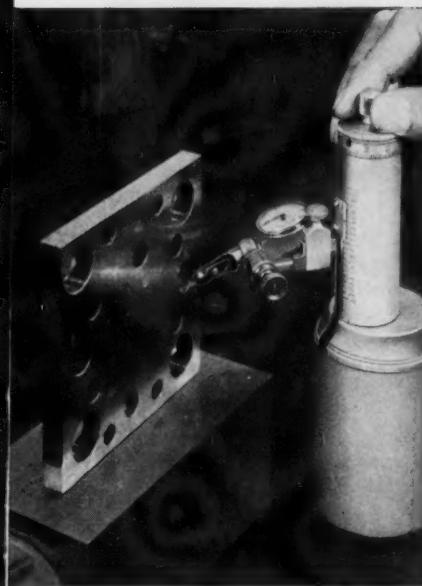
Write for • Stocked by Your
FREE CATALOG • Local Distributor

THE CINCINNATI TOOL CO.
1947 Waverly Ave., Cincinnati 12, Ohio

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FOR **FAST**
LAYOUT

GREIST
MICRO-HEIGHT®
GAGE



**New model has 5" direct capacity
—gives you 11" range with Riser**

Micro-Height measures and scribes like a vernier gage. Reads faster than your micrometer! Measures height direct from zero at base. Hundredths on barrel... thousandths on large head that eliminates errors and cuts reading time.

FAST INSPECTION!

Add the Greist Indicator Holder for speedy inspection—with your present dial indicator.

MICRO-HEIGHT "4" has 5" capacity (11" with Riser). Price, without scriber, only \$57.

MICRO-HEIGHT "2" has 3" capacity (9" with Riser). Price, without scriber, only \$36.50.

Accuracy $\pm .0003"$. Rustproof, satin-chrome finish.

Call your **GREIST** distributor or write

THE GREIST MANUFACTURING COMPANY, 493 BLAKE ST., NEW HAVEN 15, CONN.

Precision Products since 1871

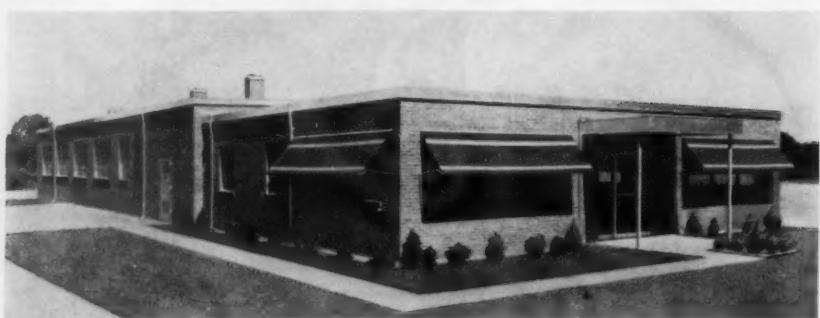
news of the industry . . .

Illustration showing Jarvis Corporation's Portland, Connecticut aircraft parts plant

These complete demonstrators will be sent to all parts of the U. S., where there is industrial activity, for a no-obligation "in plant" demonstration by Veet Radial Drill dealers.

★ modern machine shop ★

JARVIS OPENS NEW PLANTS

Jarvis Corp., Middletown, Conn., recently announced the opening of two new modern one-story plants, both located in Connecticut. The Portland plant handles specialized machining for the aircraft industry. The Guilford plant produces food processing equipment for the meat industry. Both plants are now in full operation.

LEBLOND COMPLETES NEW SHOWROOM FACILITIES

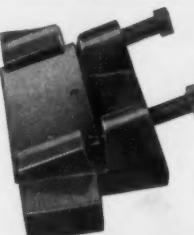
The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, recently announced the completion of new showroom facilities for the use of their customers. The new showroom is located at Madison and Edwards Roads, Cincinnati, and will feature permanent displays of operating LeBlond lathes. Visitors can inspect machines, run them and make actual production runs on their own workpieces.

Currently on display are: 15 inch Dual Drive; 19/28 inch Regal Sliding Bed Gap; 19 inch Regal Plain Gap; 15 inch Regal; 20 inch Rapid Production; 17 inch Rapid Production; 25

QUICK SURE GRIP...
FOR ANY WORK ON ANY MACHINE TABLE

**HART DIVIDED
MACHINE VISE JAWS**

Write for **WALTER W. FIELD & SON, INC.**
Circular 39-51 HAYWARD STREET, CAMBRIDGE 42, MASS.



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CIRCLE R precision underwrites your precision by holding within very close tolerances, where required. When applied to Circoloy — our special alloy — this exacting manufacture adds precise performance to saws that greatly outperform HSS in service life, longer production runs, superior cutting, lower cost. Ask your Circle R representative where to use Circoloy saws, especially in automation.

BURBANK	INDIANAPOLIS	PHOENIX
CHICAGO	MILWAUKEE	PITTSBURGH
CLEVELAND	NEW YORK CITY	PROVIDENCE
DAYTON	PHILADELPHIA	ROCHESTER
DETROIT	MONTRÉAL	ST. LOUIS
HACKENSACK		WESTBURY, L. I.

1936-7



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METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLOTTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELERS' SLOTTING SAWS
CUT-OFF SAWS • CIRCULAR
KNIFE & STABILIZER SAWS
BLADES • CIRCOLOY STEEL
SAWS • SOLID & TIPPED
TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNT-
ERBORENS • CENTER REAMERS

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Specialists in Circular Cutting Tools Since 1923

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news of the industry . . .



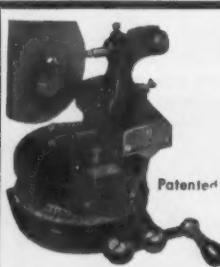
Showroom interior of The R. K. LeBlond Machine Tool Company in Cincinnati, Ohio

inch Standard Duty; 16 inch Toolroom; 24 inch Regal and miscellaneous unit displays.

LeBlond-Carlstedt Rapid Borer, LeBlond 25 inch Heavy Duty, 50 inch Heavy Duty and other lathes are also available for the purpose of inspection and demonstrations at the showrooms.

It is claimed that the new showroom facilities are part of a million dollar expansion recently completed in LeBlond's continuing program to improve service to industry. Guests from industry are invited to visit the LeBlond showroom at any time. No special arrangements are necessary.

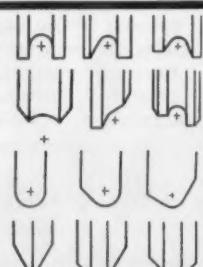
WHY WASTE TIME?



Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Write for Price and Folder.
VISIT OUR BOOTH 2054
ASTE TOOL SHOW

JEON MANUFACTURING CO.
P. O. BOX 6750 WASHINGTON 20, D. C.



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Stability



must be more than skin deep!



*Cincinnati Sub-Zero
insures maximum
stability of metals . . .
even at supersonic speeds!*

Speeds of thousands of miles per hour . . . murderous split-second temperature and altitude changes . . . today's aircraft, rockets and missiles survive an almost unbelievable assault in the vital race for preparedness.

Whether or not your products are involved in this "race", Cincinnati Sub-Zero production chilling or environmental test units can help them survive . . . produce completely stabilized steels that retain high-impact hardness and dimensional stability under toughest conditions.

Write us for Catalog and outline your needs for a no-obligation recommendation on a custom-designed unit.

MODEL
4SR-120-64

New 64 cu. ft. production unit brings 350 lbs. of AM-350 stainless steel per hr. from ambient to minus 120° F.

CINCINNATI SUB-ZERO PRODUCTS

General Offices and Plant: 3930 S 8 READING ROAD, CINCINNATI 29, OHIO

Member, Environmental Equipment Institute

For more data circle 435 on Postpaid Card

news of the industry . . .

TREYCO PRODUCTS ACQUIRED BY BOLLIER-DAMERELL, INC.

Treyco Products, Buffalo, N. Y., has been acquired and joins the Niagara Cutter and Erie Tool Divisions as a third unit of Bollier-Damerell, Inc., North Tonawanda, New York.

Since 1947, Treyco Products has manufactured self-contained power-driven sharpening equipment for cutlery, saws and tools used in the household, home workshop, commercial institutional, industrial and government fields throughout the United States.

Albert F. Lotz, founder of Treyco Products will be general manager of this division. Machinery and inven-

tory is being moved to the Niagara Cutter plant at Niagara and Schenck Streets, North Tonawanda, New York.

★ m m s ★

VAN KEUREN GETS NEW PRESIDENT

W. G. Van Keuren, president of The Van Keuren Co., Watertown, Mass., manufacturers of gages and precision measuring tools, recently retired from active participation in the affairs of the company.



- Spindle speeds up to 26,000 rpm to engrave or for machining modern materials
- Fastest possible copy set-up
- Greatest ease and speed of adjustments
- Cutter grinders, rotary tables, master letters, compound slides, name plate blanks and all required accessories

MODEL D2 HEAVY-DUTY 2-DIMENSIONAL

- 575 pounds-rigid, sturdy, precise
- Vertical adjustment of copy table automatic with Pantograph
- Unobstructed on three sides to take large work
- Vertical range over 10 inches
- Micrometer adjustment for depth of cut
- Ball bearing construction throughout—super precision ball bearings in spindle
- Ratios 2 to 1 to infinity—master copy area 26" x 10"

MODEL 106 PORTABLE BENCH MODEL—

2- OR 3-DIMENSIONAL

- 40 pounds of unbeatable speed and accuracy at a reasonable price
- Perfect for all machining applications within its range
- Ball bearing spindle has three speeds up to 14,000 rpm
- 5 positive, accurate pantograph ratios
- One copy carrier (supplied) accepts all master sizes
- Height of pantograph and position of cutter are continuously adjustable
- Work up to 10" by any width
- Taper shank cutters

G GREEN INSTRUMENT CO., INC.

392 Putnam Avenue Cambridge, Mass.
For more data circle 436 on Postpaid Card



Robert T. Parsons



"Liquid Honing* pays for itself 5 times faster than it depreciates!"

says Clarence H. Stowe,
president of a Milwaukee
tool and die shop



Dollar for dollar,
job for job, no other surface
conditioning method can
equal Liquid Honing.

"Our Liquid Honing machine," Mr. Stowe continues, "enables us to remove heat-treat scale instead of waiting for the heat treater to do it. Consequently, customers get faster job deliveries.

"In only one-fourth usual time, Liquid Honing cleans molds for repairs or remodeling — and ends what used to be a difficult, tedious hand operation.

"Many die casting and plastic molds now go out with an oil-retaining Liquid Honed satin finish that eliminates hand polishing after final heat treating.

"In addition, we clean hand tools, spare machine parts, cutting tools, electrical contacts — anything small enough to go into our machine. So it's easy to understand why Liquid Honing will pay for itself within a year — five times faster than it depreciates!"

That's the Stowe story—a "preview" of a few of many advantages Liquid Honing can bring to your tool room, machine shop or die department. You'll be surprised at the low cost — only \$550 to \$1500 for a standard machine.

Write for details or send a sample part
for free demonstration processing.

*Vapor Blast and
Liquid Honing
are trademarks.

VAPOR BLAST MFG. CO. 3013 W. Atkinson Ave.

Milwaukee 9, Wis.

For more data circle 437 on Postpaid Card



news of the industry . . .

Robert T. Parsons who has been with the company since 1941 has assumed the office of president. He is a graduate of Boston University, College of Business Administration and prior to coming to the company worked with S. D. Leisderdorf and Company, Certified Public Accountants, New York. In 1945 Mr. Parsons took over the

duties of purchasing agent and in 1948 was elected a director and treasurer of the company.

For a number of years, Mr. Parsons worked with the late Mr. H. L. Van Keuren in research and application of the principles of the over-wire measurement of gears and other threaded parts.

He now represents the company in The American Gear Manufacturers Association and is a member of the Inspection Committee of that association.

★ m m s ★

HARIG ACQUIRES V & O NOTCH- ING MACHINE

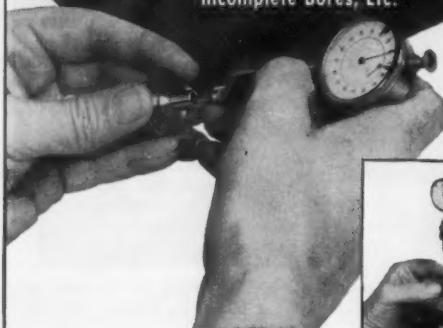
Harig Manufacturing Corp., 5757 West Howard St., Chicago, Ill., precision tool and die maker and machine tool builder, recently announced the acquisition of a V & O 410 Notching Machine. It is said that the company is now equipped to supply short-run and special laminations suitable for production on such a machine. The lamination field is not new to Harig, since the building of lamination dies has been a Harig specialty for many years.

DIATEST High Precision BORE GAUGE

Eliminates Need for All Special Hole Gauges!

MEASURES ALL BORES

Out of Round, Tapered, Barrel Shaped,
Incomplete Bores, Etc.



.00004"
ACCURACY
ACTUAL
RANGE
.057" to .828"



All units and sets overlap in size for complete range, and come equipped with corresponding Ring Gauges as comparators. Exact continuous readings are indicated on large dial.

FOSTER SUPPLIES CO., 6122 Milwaukee Ave., Chicago 30, Ill.
Gentlemen: We are interested in additional information on your New DIATEST Bore Gauge.

NAME _____ POSITION _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____

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industry news in brief . . .

According to the **Adamas Carbide Corporation**, Kenilworth, New Jersey. **J. K. Kessler and Associates**, P. O. Box 10263, Tampa, Florida, appointed representative for the entire State of Florida. **Blaine Richards Company**, 6140 Winnpeny Lane, Indianapolis, Indiana, appointed representative in central and southern Indiana and western Kentucky. **R. A. Heller Company**, 5609 Vine Street, Cincinnati, Ohio, appointed distributor in Cinti, O.

Marion W. Klippel appointed eastern regional sales manager, **National Automatic Tool Company, Inc.**, Richmond, Indiana.

Donald M. Patterson appointed vice president and general sales manager of manufacturing divisions. **Warren R. Lowe** appointed general manager of The Avey Division and **George W. Drees** a appointed assistant general manager. **Eugene Reutman** will be in charge of sales for Avey, **The Motch and Merryweather Machinery Company**, Cleveland, Ohio.

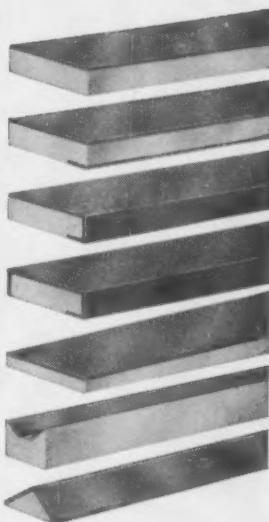
James Schaeffer has been promoted to assistant to the production manager, **Miller Fluid Power Division, Flick-Reedy Corporation**, Melrose Park, Illinois.

William A. Surzik named plant manager and **Norman E. Prochaska** named manager, Machine Controls Systems, **Cleveland Instrument Company**, Cleveland, Ohio.

The Ohio Knife Co. is offering machine tool builders and users amazing new hardened ways.

**available in 7 standard
cross sections in over
sixty sizes.**

By a time proven process, special analysis tool steel of any thickness is eternally bonded to a soft, tough, easily machinable steel, producing a superior way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to full depth of tool steel, along entire length of way, develops tremendous wear-resistant qualities, practically eliminating galling or scoring. The result is a continuing high degree of accuracy of the machine under even the severest work loads.



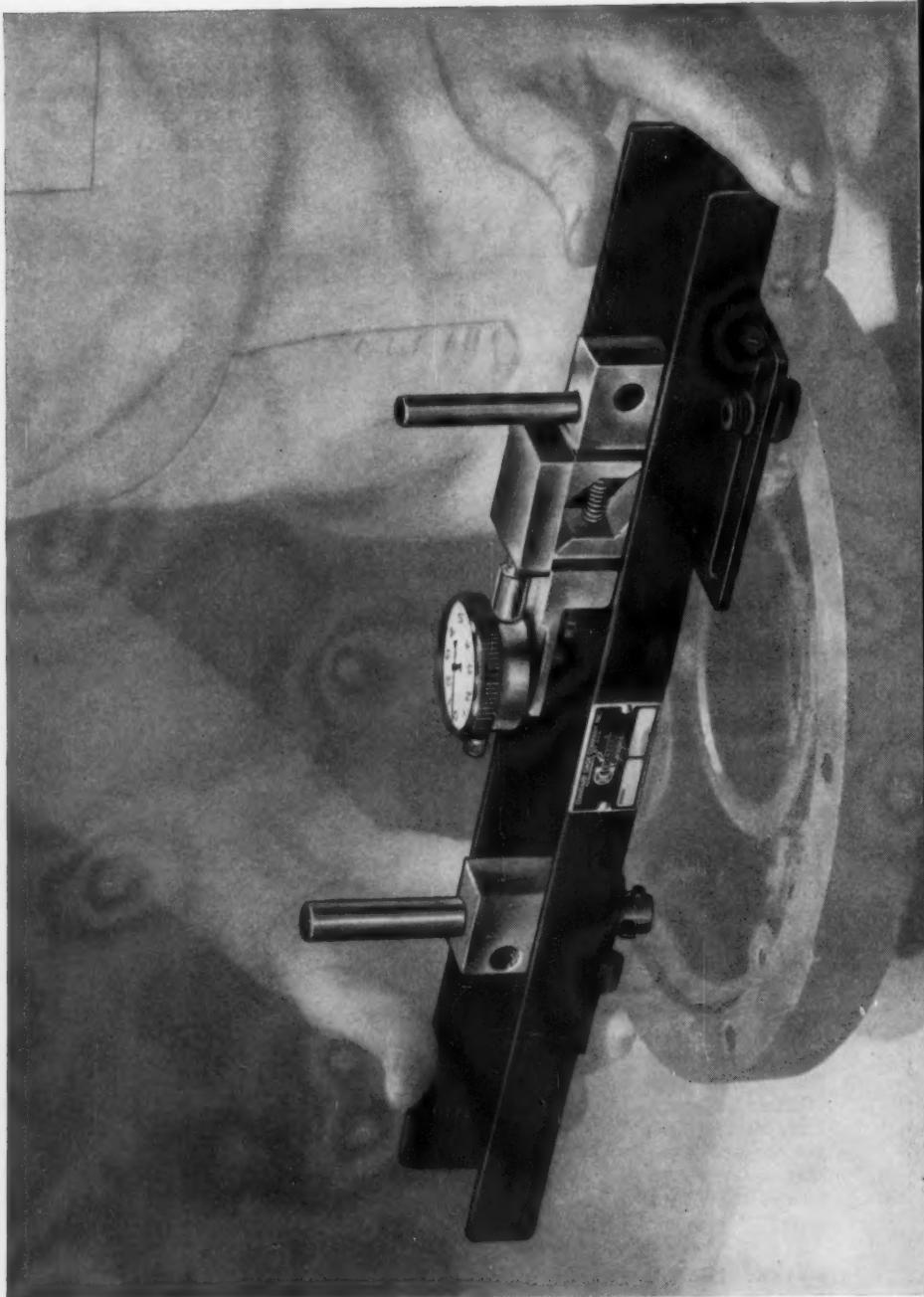
FREE

technical literature available.

- HARDENED WAYS—Seven Cross Sections in over 60 sizes.
- SHEAR BLADES.
- SLITTING—A Basic Guide for the New Operator.

THE OHIO KNIFE CO., Cincinnati 23, Ohio, Dept. 73-HH

For more data circle 439 on Postpaid Card



NOW! Adjustable Shallow Diameter Gages LOWEST PRICE . . . "Tenth" Accuracy

This new, multi-purpose, multi-range series by **STANDARD** obsoletes the need for expensive, specially designed shallow diameter gages. New type reed-linkage insures positive, accurate transfer of movement from contact point to indicator.

Gages are easily set to regular adjustable masters or with gage blocks and parallels. Tail and head assemblies are interchangeable between frames of

different lengths. Smallest size permits checking I.D.'s or O.D.'s down to 4" and depth adjustment permits easy measurement from 0" to 2" below supporting plane. Greater depth ranges if needed.

All this at *lowest price*. So, if your production includes any problems of shallow diameter gaging be sure to ask the *Man from Standard*. Or, write us right here at the plant.



A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE TYPES

For more data circle 441 on Postpaid Card

POUGHKEEPSIE, N.Y.

STANDARD GAGE COMPANY, INC.

industry news in brief . . .

Clifford J. Baxter, general sales manager has recently retired after 34 years of service with the **Gisholt Machine Company**, Madison, Wisconsin. **Robert H. Bruce** has been appointed to succeed Mr. Baxter. **Rodney H. Stebbens** succeeds Mr. Bruce as assistant general sales manager.

Thomas F. MacLaren has been appointed general sales manager, Machine Tool Division, **Brown and Sharpe Manufacturing Company**, Providence, Rhode Island.

Earl L. Prais named factory manager, **Madison Industries, Inc.**, Muskegon, Michigan. Four sales representatives have been appointed: **Arens Sales Company**, Tulsa, Oklahoma; **The Bauer Company**, Fort Worth, Texas; **Gotta and Landry**, Middletown, Connecticut; and **Arthur R. Shelvin Company**, Woonsocket, Rhode Island.



*Six machines protected from dust
by Torit for* **\$666 15**

This Torit Dust Collector, Model 219FM, complete with accessories, was installed by the Mohr Lino Saw Co., Skokie, Ill., to protect 3 belt sanders and 3 other grinders (2 grinders hidden from view) from destructive dust—at a total cost of just \$666.15!

After one year's operation, Mohr Lino Saw says this about their low-cost Torit installation: "The Torit installation has kept our shop cleaner, our operators happy, and protected vital machinery."

You too can achieve greater machine protection and cleaner working conditions by trapping dangerous or valuable dust at its source with a completely self contained and portable Torit Dust Collector. For full details write to:

TORIT MANUFACTURING CO.

Dept. 703, 311 Walnut Street, St. Paul 2, Minn.

For more data circle 442 on Postpaid Card



Low cost—high speed hard-facing with the new METCO THERMO SPRAY process

Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies—simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMO SPRAY GUN and the THERMO SPRAY Hard-Facing Alloys, these disadvantages have been overcome.

The THERMO SPRAY GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMO SPRAY Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed *Metco Process*, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



Metallizing
Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
Metallizing Engineering Co., Inc.:
METCO[®], **ThermoSpray**[®] Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.
Please send me more information

- about the New ThermoSpray Gun
 about ThermoSpray Hard-Facing
 Please arrange a demonstration in my shop.

For more data circle 443 on Postpaid Card

name _____

company _____

street _____

city _____ zone _____ state _____

industry news in brief . . .

Philip F. Kattan appointed manager of sales promotion department, **Zagar, Inc.**, Cleveland, Ohio.

J. Roy Gordon elected to board of directors, **The Babcock and Wilcox Company**, Beaver Falls, Pennsylvania. **Joseph E. Kossan** appointed service engineer for Pittsburgh district, Boil-

er Division. Mr. Kossan succeeds **Harry G. Klein**, who recently retired after 39 years with the company. **William W. Gilbert** appointed manager of Detroit sales office, Boiler Division. Mr. Gilbert succeeds **Arthur R. Waugaman**, who recently retired after 22 years of service. The district sales office of **A. M. Lockett and Company, Ltd.**, sales engineering representatives have been moved to 1701 Mercantile Dallas Building, 1807 Commerce Street, Dallas 1, Texas.

STOP "FUMBLEITIS" WITH

Magna-tip®

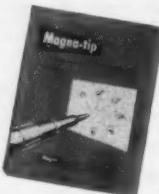
**MAGNETIC
SCREW DRIVING
ACCESSORIES**



Magna (magnetic) bit holders, finders and sockets for all power screwdrivers, eliminate "fumbleitis" by firmly holding screws, bolts or nuts in assembly operations. Proven in use in hundreds of plants, Magna-Tip accessories can help push your production up and costs down. Ask your power screwdriver salesman to show you these handy Magna accessories.

8

WRITE for manual on the complete line of Magna-Tip bit holders, finders, sockets and hand screwdrivers: Dept. 92GI, Magna Driver Corp., 779 Washington St., Buffalo 3, N. Y.



For more data circle 444 on Postpaid Card

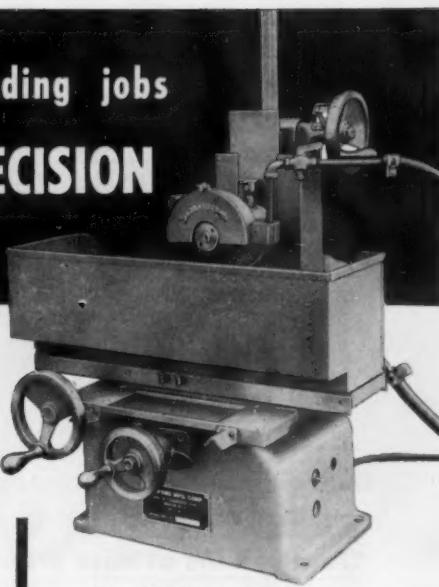
to do small grinding jobs
to **MICRO-PRECISION**
FAST...

**you need
the
SANFORD
Model SG
SURFACE GRINDER**

This unrivalled small parts grinder can be depended upon for micro accuracy. It's easy to use too . . . every hand wheel and operating switch is at your finger tips.

Designed and built by engineers and tool makers of rare foresight for tool, die and gage work, it has been constantly preferred after these many years of proven worth.

Write for fully illustrated literature, replacement parts and special attachments data with price list.



**For WET or DRY
grinding, specify
optional equipment.**

PARTIAL SPECIFICATIONS —

Chuck Surface—3" x 5" or 4" x 6".

Table travel—8", traverse 4".

Vertical head movement—6".

Work area under 4" wheel—6",
with chuck—4".

Standard grinding wheel—
4" x 3/8" x 1/2".

Spindle speed—approx. 5500 RPM.

Motor, 1/6 HP, single or 3 ph.,
dynamically balanced.

Dimensions—23" x 30" x 27" high.

Net wt. approx. 160 lbs.

Representatives in major industrial areas

SANFORD MANUFACTURING CORP.
1022 Commerce Ave., Union, N.J.

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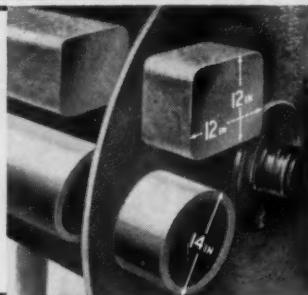
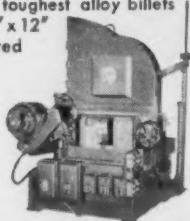
Abrasive Cutting Machines

Abrasive Cutting Know-How

Know-How is just as vital to top performance in abrasive cutting as in any other machine tool operation

CAMPBELL MODEL 412

For fast, quality cuts of mild steel or toughest alloy billets up to 12" x 12" as pictured



Users of Campbell Abrasive Cutting Machines get Tremendous Savings with Fast, Accurate, Quality Cuts of Mild Steel or Toughest Alloys

Write us and we will gladly send you helpful information on the working capacities of the 16 models of CAMPBELL Machines and the CAMPBELL Operating Features that explain the outstanding performance of these machines in cutting a wide variety of shapes and sizes of stock—channels...bars and tubing from the smallest to 14" diameter...plate up to 4" thick and 20 feet long...billets up to 12" x 12".

CAMPBELL Machine performance is well illustrated by the Model 412 pictured above. This machine cuts through 12" x 12" billets of mild steel or toughest alloys (even titanium) in the almost unbelievable time of 6 to 10 seconds per square inch...with quality cuts.

Here are some of the operating features that account for comparable speed and quality of cuts by CAMPBELL's 10 high speed production models...two of them fully automatic for highest production.

Campbell Machine Division • AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 446 on Postpaid Card

202 modern machine shop

Oscillation of the Cutting Wheel to maintain cutting speeds and greatly lengthen wheel life is prescribed by CAMPBELL for all solids cuts over 2" in diameter.

Wet Cutting gives maximum assurance of Quality Cuts.

Ample Power, essential to good performance, is supplied for the Model 412 by a 40 HP motor.

Sound Work Holders—essential to accuracy.

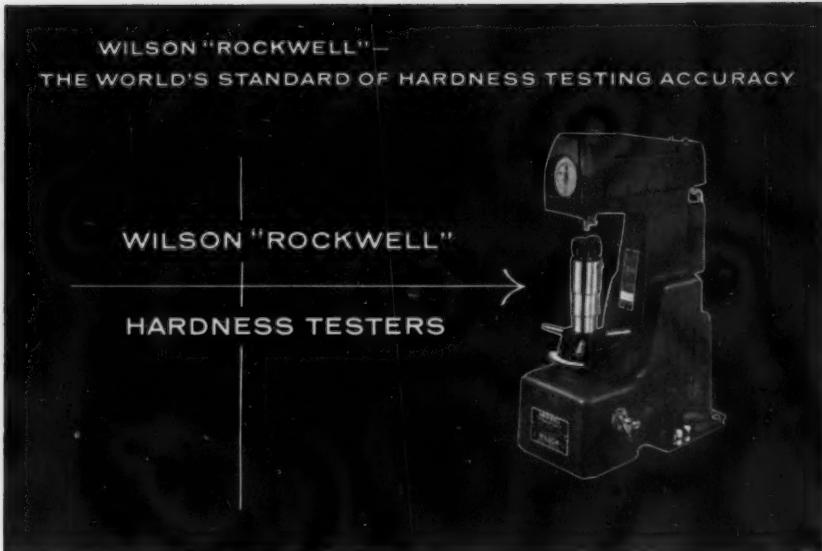
For greatest abrasive cutting accuracy, CAMPBELL provides two oscillating machines that rotate the work—round bars or tubing from 3" to 14" diameter.



*For further information
write for the
illustrated
Bulletin DH-460-B*



March, 1958



A FULL WILSON LINE
TO MEET EVERY
HARDNESS TESTING
REQUIREMENT

- **FULLY AUTOMATIC**
- **SEMI-AUTOMATIC**
- **REGULAR**
- **SPECIAL**
- **SUPERFICIAL**
- **MICRO & MACRO HARDNESS TESTERS**

When it's **WILSON "ROCKWELL"-TESTED** **you KNOW it's RIGHT!**

Easy to operate—all controls at hand. *Takes rough service*—maintains accuracy after years of operation.

Expert Wilson Service—helps you choose proper model...keeps it at work. A staff of WILSON hardness testing experts is available to provide quick emergency service if it is ever needed.

The booklets listed below give complete and helpful data on the indicated WILSON equipment...

DH-325 for "Rockwell" Regular

DH-326 for "Rockwell" Superficial

DH-327 for Accessories & Specials

Write for
one or all
of these
booklets
DH-325
DH-326
DH-327



WILSON
MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N.Y.

For more data circle 447 on Postpaid Card

March, 1958

modern machine shop 203

new
shop
equipment

new shop equipment

**Descriptions of new machines, tools
and materials for metalworking.**

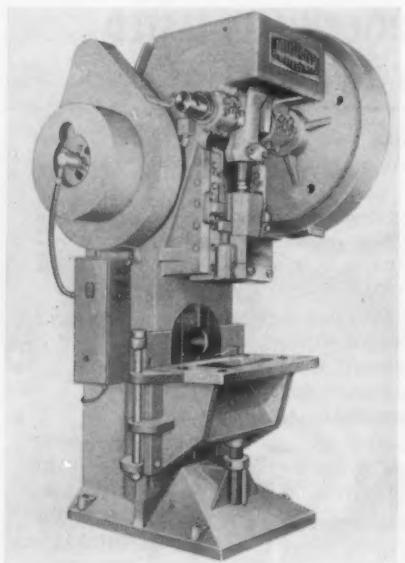
60 TON HORN PRESS

A 60 ton horn press has been added to the line of power presses manufactured by the Johnson Machine and Press Corp., 620 West Indiana Ave., Elkhart, Indiana.

Called the H-60, this horn press is offered in both flywheel and single back geared models. Air clutch and

electrical controls are standard features. Table to slide with standard 4 inch stroke down and adjustment up is 9 inches, with a maximum on special order up to 33 inches. Crankshaft strokes up to 12 inches are also available. The 60 ton press is available with horn and adjustable swinging table. **For more data circle 70 on Postpaid Card**

★ modern machine shop ★



Johnson Horn Press has capacity of 60 tons

CONTROLLED ATMOSPHERE ELECTRIC FURNACE

A line of controlled atmosphere electric furnaces, known as the "Atmo-Carb" Controlled Atmosphere Electric Furnaces has been announced by the L and L Manufacturing Co., Chester 77, Pa. Operation is simple and no experience with atmosphere generators is necessary. The temperature range is 2,000 degrees F. The furnaces are complete with Inconel muffle of heavy construction and a fully equipped atmosphere generator. A standard line is available in the MHE Series with a shuttle muffle with a loading elevator. The MHD Series is a direct loading muffle type with a vertical counterbalanced door and is complete with a flame seal.

The elements are of Kanthal, supported in Dyna-Glow element holders for easy replacement of the element.

and shop materials

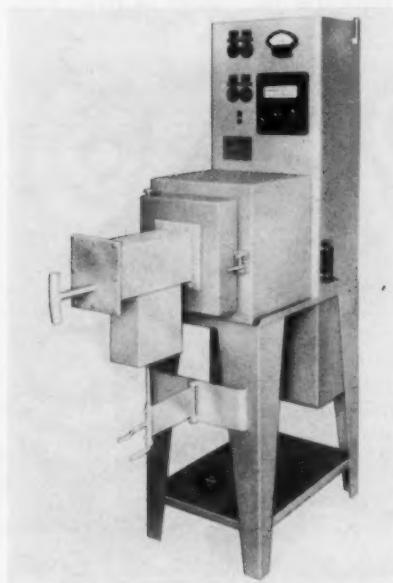
new
shop
materials

Edited by L. L. BALDHOFF

The atmosphere generator provides a process utilizing alcohol as one of the possible atmosphere generating liquids. The alcohol provides an accurate and easily modified medium for treating various types of steel. The atmosphere is useful for clean hardening, carburizing, preventing decarburization of straight or chrome nickel

steels. It may also be used for case hardening of low carbon steels. Bright hardening may also be accomplished under carefully controlled conditions when quenching in an atmosphere type quench chamber.

The units are available as follows: 4½ inches wide by 5½ inches high by 8 inches, 8 inches wide by 6 inches deep by 14 inches high, and 8 inches wide by 6 inches high by 18 inches deep firing chamber sizes. There are six standard models. Special size units are also available upon request. For more data circle 71 on Postpaid Card



L and L "Atmo-Carb" Electric Furnace

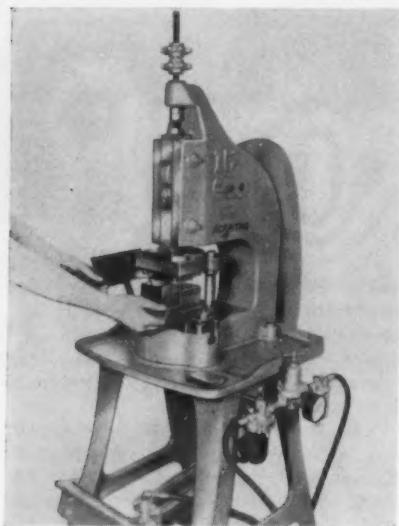
★ modern machine shop ★

TAG PRESS IS AIR OPERATED

A metal tag producing press is now being offered by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. It is a combination of a standard foot press with a combination embossing, punching, blanking and flattening assembly in die set and with power provided by an air cylinder arrangement, permitting its use from an ordinary air line of 75 p.s.i. or more. A foot control valve operates the press and a guard is provided if scrap material is used for tags, necessitating close hand feeding.

Deeply engraved, heavy duty style steel type is used interchangeably in

new shop equipment . . .



Acrotag Metal Tag Producing Press

the type holder, which has been designed for quick change. Blanking dies and hole punches are made for standard sizes of tags, but can be readily adapted to special requirements. Embossing and blanking pressure is sufficient for light gauge aluminum, tin, terne plate, zinc, stainless or copper strip or sheet, and a precise and clean blanking and punching job is claimed to be provided by the uniform air power arrangement.

Designated as the Acrotag Machine, it is equally effective for both raised and sunken embossed characters. Overall height of the press is about 64 inches and the floor space that is required is about 22 by 28 inches, not including the foot control valve. The weight of this metal tag producing press, ready for shipment, is approximately 590 pounds.

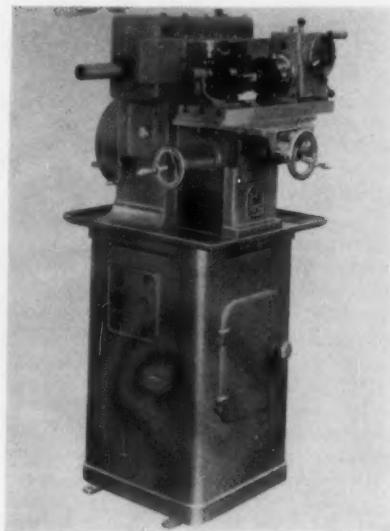
For more data circle 72 on Postpaid Card

**PUNCH-SHAPER MACHINES
RADII AND ANGLES
AUTOMATICALLY**

Jersey Manufacturing Co., 442 Livingston St., Elizabeth 1, N. J., recently announced its improved Jemco K-150 Form and Punch Shaper. This shaper, which makes irregular shaped stamping and electrode punches of high precision—plus or minus 0.00025 inch—now employs a larger dividing head with automatic circular feed. This permits the machining of radii and angles automatically.

In addition, punches need no further machining operations when completed on the K-150.

All workpieces are clamped directly in a collet holder, between centers or to the coordinate chuck. The coordinate chuck and indexing attachment guide the workpiece along the contour with one chucking, thereby eliminating errors that may occur in rechucking.



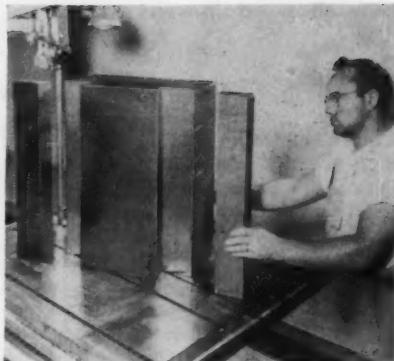
Jemco K-150 Form and Punch Shaper

All machining operations can be checked in the shaping process with the special built in 30 power microscope. This special microscope, which is used in the manufacture of extremely high precision punches for instruments, clocks and watches, is also an accurate measuring device. **For more data circle 73 on Postpaid Card**

★ modern machine shop ★

BAND MACHINE IS IDEAL FOR HEAVY DIE WORK

A band machine called the Band Mill, is now being manufactured by The DoAll Co., Des Plaines, Ill. The machine has a throat capacity of 26 inches, work height of 24 inches and uses high speed steel saw bands up to 2 inches wide. It has a 40 inch travel and is equipped with a two ton capacity work table, which is powered by hydraulic cylinders for rapid posi-



DoAll Band Mill machining large die blocks

tioning and by a variable speed fluid drive operating a ball screw to give positive slow feed control for heavy die work. The movable pendant control station provides operator convenience.

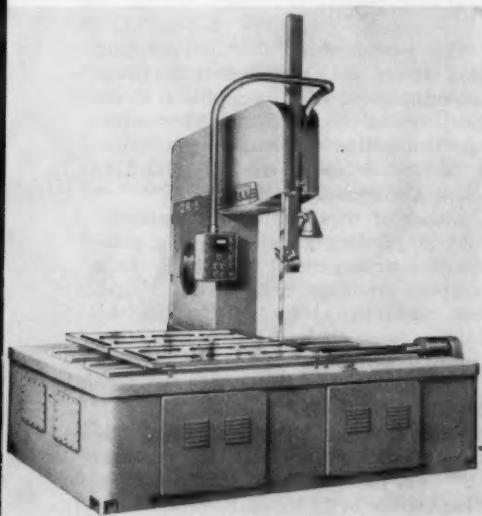
The extreme rigidity and power enable the DoAll Band Mill to relieve milling machines and planer type mills of the roughing operations required on the tough, alloy steel die blocks. The Band Mill can be used to cut die blanks from rough billet, bring them to size by skin cuts and shank the dies.

Not only does this band machine break die shop bottlenecks by freeing milling machines for other work, but it also saves expensive die steel. The unwanted material is removed in large usable sections. The speed and simplicity of the tooling is also appreciated in die work. It is claimed that even the most complex, compound angle cuts can be set up easily and quickly using standard shop hardware. **For more data circle 74 on Postpaid Card**

★ modern machine shop ★

THREAD ROLLING MACHINE

A two die type horizontal cylindrical die thread rolling machine has been



DoAll Band Mill designed for large die work

new shop equipment . . .

announced by Reed Rolled Thread Die Co., P. O. Box 350, Worcester 1, Mass. This Model B 111 is suited for high production and job shops and for both in-feed and thru-feed thread and form rolling on large and small production runs.

The machine is simple and entirely mechanical in operation. It is rugged in construction and is compactly designed. The ease of setup makes possible quick changeover from one job to another. During the rolling, one die remains in a fixed position and the other is movable. It is fed into the work by means of a cam actuated head which provides for positive control of the feed and size through uniform penetration rates and predetermined length of dwell. Fine micrometer adjustment provides for accurate final sizing.

Both dies rotate in synchronism. A simple, precise, rotary "matching" device offers a quick and positive means

of positioning the threads on the dies in correct relation to one another, so that the dies track properly when contacting the blank. The dies always remain in match during rolling.

Standard work rest blades and standard work stops are available for in-feed rolling. Work diameters up to 2 inches can be handled by the in-feed method; up to $\frac{3}{4}$ inch by thru-feeding. Thread lengths up to $1\frac{1}{8}$ inches can be rolled by the in-feed method; by the thru-feed method, up to 20 feet. This machine is operated by a 5 h.p. motor with pushbutton controls. A wide range of die and cam speeds is provided as standard equipment. This machine can be used for manual, semi-automatic or completely automatic feeding. Floor space of the machine for in-feed rolling is 40 by 39 inches. Working height is 42 inches.

For more data circle 75 on Postpaid Card

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CONVERSION UNIT FOR GRINDERS

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has announced that, in addition to its independent dust collectors for separate connection to grinding machines, it is now offering the GRIND-Air-rester Conversion Unit.

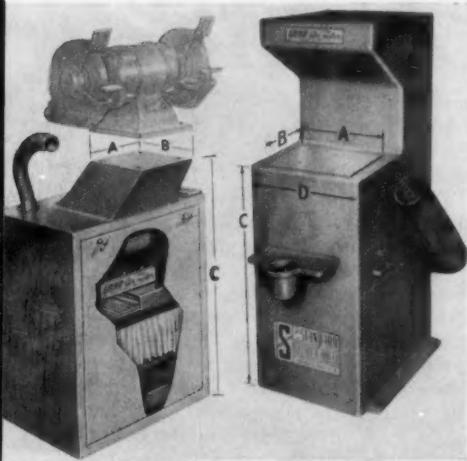
Either of these units will instantly convert existing grinders into a combination arrangement and represent a compact arrangement, taking but a few additional inches beyond the depth (front to back) of an existing pedestal grinder.

The illustration at the left on Page 209 identifies the combination pedestal-cabinet to serve 7, 8 or 10 inch grinders. Dimensions are: "A" $8\frac{1}{4}$ inches; "B" $11\frac{1}{8}$ inches; and "C" $26\frac{1}{8}$ inches. Floor space is 22 by 20 inches.

The illustration at the right has capacity for two 12 inch or two 14 inch



Reed Model B 111 Thread Rolling Machine



GRIND-Air-rester Conversion Unit

grinding wheels, the "A" of 16 inch and "B" of 12 inch is adequate to serve the average base mounting on a 2 or 3 h.p. grinder. The "D" width of base of $17\frac{1}{2}$ inches identifies the required clearance between the exhaust guards on the grinder. "C" is $3\frac{1}{2}$ inches.

Both units illustrated have a self-contained motor driven dust collecting fan with efficient filtering units and removable dust collecting drawer.

For more data circle 76 on Postpaid Card

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GEARED-IN-RAM VERTICAL MILLING MACHINE

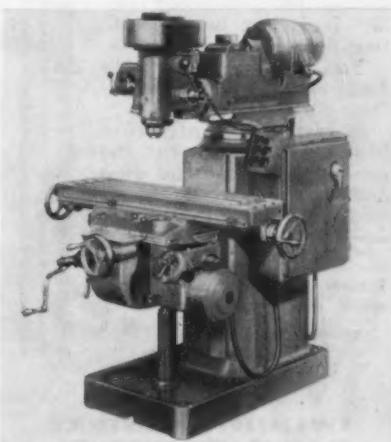
A geared-in-ram vertical milling machine has been introduced by Tree Tool and Die Works, Racine, Wis. This 2VG Mill has a quill capacity to handle cutters up to 4 inches in diameter with ease. The quill is driven by a 3 h.p. motor mounted on the ram.

Features of the mill include an automatic collet closer for holding cutters in position and eliminating tool slip-

page, which holds tools up to 1 inch diameter shank size; roller spindle drive, which eliminates backlash; and a turret lock which operates with a single motion.

The Tree 2VG Mill has 12 speeds ranging from 50 to 2,500 r.p.m.; six geared changes in the ram gear box; high and low range selection on the head; neutral position on the head for rotating the spindle by hand; 6 inch quill travel by hand feed lever, hand-wheel or power feed; three dial selected rates—0.001, 0.0025 and 0.006 inch per revolution; feeds both up and down. The ram is of the dovetail type with integral gear box and motor mounted; permits moving the spindle to any position without the necessity of resetting for alignment; movements to the ram and headstock are controlled by a rack and pinion.

The saddle is amply proportioned to provide long, broad bearing surfaces in knee to saddle and table to saddle ways. Sturdy gibbs are easily adjusted for alignment, accuracy of movement and compensation for wear. A built in Bijur pump assures proper lubrication.



Tree Geared-In-Ram Vertical Milling Machine

FASTER FEEDS WITH... **SUPERBORE**

THE **COUNTERBORES** WITH

Standard

$\frac{1}{64}$ " *Oversize*

$\frac{1}{32}$ " *Oversize*

AVAILABLE FROM STOCK
FOR EACH SCREW SIZE

30° Right Hand Spiral, 4 Flute
Now you can speed up production 100% with our New 30° fast right hand spiral, four-flute counterbores.

You will find that faster feeds are possible with this freer-cutting tool.

Hardened counterbore blanks in stock can be ground to any special pilot and flute diameters in one week.

Complete Reamer catalogue with world's Greatest Reamer selection by the Thousands' and thousands.

Write for it today!

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Reamer selection by the Thousands' and thousands.
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**TWENTIETH CENTURY
MANUFACTURING CO.**

new shop equipment . . .

tion. One shot of the Bijur lubricates the table to saddle ways, knee to saddle ways, table screw and power feed gearing conveniently and efficiently.

The 2VG is equipped with a built in motor driven longitudinal table feed box, which provides a convenient range of five rates of feed and rapid traverse. This unit is independent of the table, being a part of the saddle construction and having a hand scraped supporting way on the knee. The feed rates of $\frac{3}{4}$, $1\frac{1}{8}$, $2\frac{3}{8}$, 4 and 7 inches per minute are changed quickly and easily by a single crank at the operator's fingertips. The rapid traverse has a speed of 70 inches per minute and it can be operated when the feed is engaged.

Knee to column ways have been extended above the saddle slide to give greater bearing surface and support to the knee without sacrificing spindle to table capacity. All controls are grouped for accessibility and ease of operation.

For more data circle 77 on Postpaid Card

★ modern machine shop ★

COMBINED DRILL AND COUNTERSINK

Chicago-Latrobe, 419 West Ontario St., Chicago 10, Ill., is now producing a high speed steel combined drill and countersink, which produces a drilled hole and countersinks it all in one operation. This tool has been design-



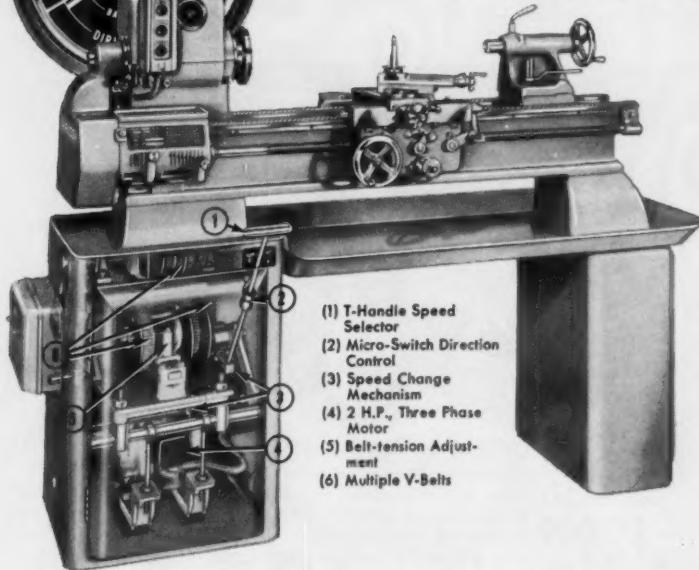
Chicago-Latrobe Drill and Countersink

SHELDON Variable Speed PRECISION LATHES



...any speed INSTANTLY*

*Spindle speeds changed at 200 r.p.m. per second. Built-in tachometer permits accurate selection of speeds from 200 to 2000 r.p.m. in direct drive—40 to 300 r.p.m. in back gear.



This new lathe instantly meets every changing speed requirement in the tool room, or quickly sets and holds to any prescribed speed for production runs.

Rugged, Heavy-duty Variable Speed Drive —an oversized unit with double V-belts throughout that delivers positive full-power to the spindle.

High Spindle Speeds—from 200 r.p.m. to 2000 r.p.m. (direct drive), from 40 r.p.m. to 300 r.p.m. in back gear.

Instant and Automatic (power driven) Speed Selection—Only 9 seconds to change from low to high speeds in either direct drive or backgear. Speeds are changed automatically when T-handle is lifted or pushed into engagement.

High Horsepower at All Speeds—Because the drive unit is oversized, it has larger belts which deliver maximum gripping power at all speeds. A 2 H.P., three Phase motors recommended.

Additional lathe features: Zero Precision tapered roller spindle bearings, 54 pitch gear box, heavy cast pedestal, tool-room accuracy. Optional accessories include hardened bed ways, L00 long taper key drive or 4" D1 Camlock spindles.

Sheldon Precision Variable Speed Drive Lathes are available in 11" or 13" Swing, Model WM-56-P (Illustrated) less motor and switch, \$1,944.00 F.O.B. Chicago. Other 10", 11", and 13" Sheldon Precision Lathes from \$898.00 up. Also 13" and 15" Sebastian Geared Head Lathes, Sheldon Milling Machines and Sheldon Shapers.

Write for Catalog

SHELDON MACHINE CO. INC.

For more data circle 449 on Postpaid Card

4250 N. KNOX AVE. • CHICAGO 41, ILL.

March, 1958

modern machine shop 211

new shop equipment . . .

ed with a spiral flute, in both plain and bell type points. Included angle of the plain type is 60 degrees and the bell type is 120 degrees. The diameter of the drill portion equals the length of the drill. Smooth accurate holes are said to be produced by this tool and it is claimed that production is in-

creased due to chip removal and free cutting action.

For more data circle 78 on Postpaid Card

★ modern machine shop ★

KING SIZE FLAT SPOT DRILL

B and W Precision Products Co., Engineering Dept. M, 11393 East Eight Mile Rd., Detroit 5, Mich., is now offering king size flat spot

drills, which are available in two styles, for non-ferrous materials and for steel, in the large size ($\frac{1}{4}$ and $1\frac{1}{2}$ by 3 inches) to take care of the maximum capacity of 2-G B and S Screw Machines. These spot drills are stocked also in 90 and 118 degree included angle drill points, ground either for brass or steel and with either right or left hand cut. Additional savings are said to be effected for users of left hand drills, as lefts are furnished at no premium cost.

For more data circle 79 on Postpaid Card

USE
AIR...
SAVE
FINGERS

LITTELL

PRES-VAC SAFETY FEEDERS

... operate on a minimum of air—only 45 lbs. psi and handle parts from 2 to 10 lbs.

SAVE MONEY • SAVE TIME • SAVE HANDS • SAVE FINGERS
No. 22157

Prices
F.O.B. Factory

VAC-U-MATION DIVISION

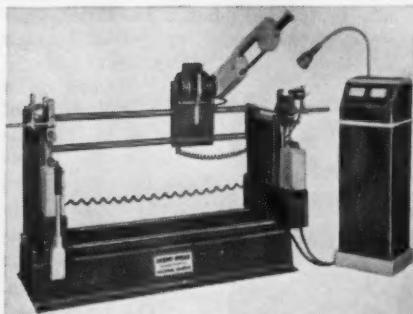
4143 Ravenswood Avenue Chicago 13, Illinois
District Offices Detroit and Cleveland

For more data circle 450 on Postpaid Card



B and W King Size
Flat Spot Drills

NOW! The most versatile, precision DYNAMIC BALANCERS ...At Lowest Cost!



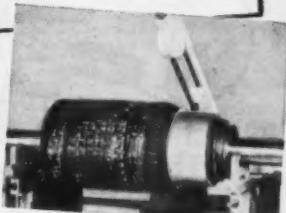
THE NEW STEWART-WARNER ELECTRONIC INDUSTRIAL BALANCERS

- 4 models for use in single-piece, short-run or long-run production quantities.
- Set-up time less than 2 minutes!
- For balancing a wide range of work on same machine — with no special tooling, coupling devices or accessories needed to change jobs!

Only the Stewart-Warner Balancers Offer These Maximum and Minimum Ranges:

	Weight Range	Diametral Range	Length Range	Sensitivity
Model 702	1/4 lb. to 300	1/4" to 30"	4 1/4" to 40"	0.01 inch-oz.
Model 704	1/2 lb. to 1000	1/2" to 44"	4 1/2" to 55"	0.01 inch-oz.
Model 708	1 lb. to 5000	1" to 68"	7" to 83"	0.04 inch-oz.
Portable		In-place balancing of all rotating machinery.		

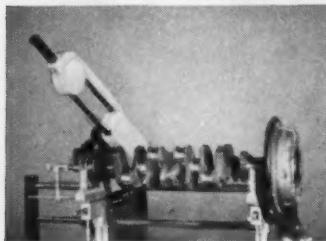
*Various weight and length modifications available upon request.



Balancing an Armature

The new Stewart-Warner Industrial Balancers not only give you lowest first cost, but cut the cost of balancing per piece so low that even smallest shops can afford their own precision balancing equipment!

Handle single-piece, short-run and long-run production, as well as maintenance of your own machines. Semi-skilled workers can learn to operate them in one day! Versatile, accurate.



Balancing a crankshaft



STEWART-WARNER
CORPORATION

Mail coupon
for illustrated
brochure!



Stewart-Warner Corporation, Dept. YY-38
1850 Diversey Parkway, Chicago 14, Illinois
Please mail me all the facts about Stewart-Warner
Industrial Balancers.

Name.....

Company.....

Address.....

City..... Zone..... State.....

For more data circle 451 on Postpaid Card

new shop equipment . . .

**COMPARATOR MEASURES GAGE
BLOCKS AND LENGTH BARS
UP TO 40 INCHES**

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., has announced the availability of a high precision comparator which has been designed for the exact measurement of both gage blocks and length bars.

The wall mounting type will check a gage up to 40 inches in length; the bench type checks to 14 inches in length. As end bars are positioned vertically for checking, the problem of sag does not have to be considered. Readings may be made to 0.000001 inch.

The device consists of a sensitive level mounted on an aluminum cradle to which two balls are attached, which move up or down the pillar. The upper side of the base has a hardened steel platen of $5\frac{1}{8}$ inch diameter, ground and lapped to a few millionths of an inch. To this platen the gages to be compared are wrung into such a position as to be under the balls of the level.

The level housing is then lower-

**DOES THE WORK OF
4 DRILL
PRESSES**



FITS
ALMOST ANY
DRILL
PRESS

**DRILLS—REAMS
COUNTERSINKS
COUNTERBORES**

quadrill

4 POSITION DRILLING & TAPPING TURRET HEAD

Saves Set-up Time • Saves Production Time

With Quadrill you can use four drilling or cutting tools on one drill press by simply indexing for each tool. Precision built for rugged duty—long service. Specify make and size of drill press when ordering QUADRILL.

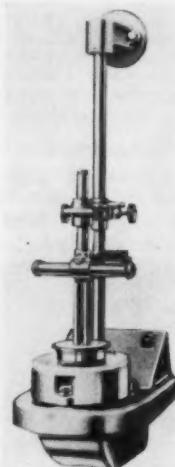


CHICAGO QUADRILL

Company

1854 BUSSE HIGHWAY • DES PLAINES, ILL.

For more data circle 452 on Postpaid Card



**Self-Checking
Comparator**

NEW... LOW...



only $2\frac{7}{8}$ " high!

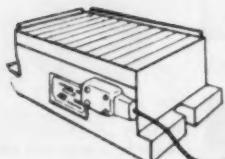
MAGNA-LOCK model L ELECTROMAGNETIC CHUCKS

**7 SIZES TO
CHOOSE FROM**

- 5" x 10"
- 6" x 12"
- 6" x 18"
- 8" x 18"
- 8" x 24"
- 10" x 15"
- 10" x 16"

Now — more working height under the grinding wheel plus the advantages of Magna-Lock fine pole laminated top — 22% more holding area, work pieces held to extreme edges of top — famous Magna-Lock holding power.

Here's new cost-cutting chucking for your tool room and your production machining operations. Get the full details now. Write Dept. MM-38.



Hanchett **MAGNA-LOCK**
CORPORATION

BIG RAPIDS, MICHIGAN, U. S. A.

designers and makers of a complete line of magnetic chucks and devices.

For more data circle 453 on Postpaid Card

new shop equipment . . .

ed until the balls make contact. This lifts the level clear of its case and the position of the bubble is read against the scale attached to the casing. The scale is marked out so that one division corresponds to a tilt of 0.00001 inch over the spacing of the balls.

For more data circle 80 on Postpaid Card

**NUMBERING HEAD WITH
INTEGRAL CAM**

George T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Ill., is offering five popular sizes in numbering heads—the Model 10—1/16, 3/32, 1/8, 5/32 and 3/16 inch, for immediate delivery from stock.

These numbering heads are a new departure in the design of numbering head wheels: the wheels and cams are built integral.

The cams are milled directly on the wheel blanks, thus eliminating holes in both the wheel and the cam.

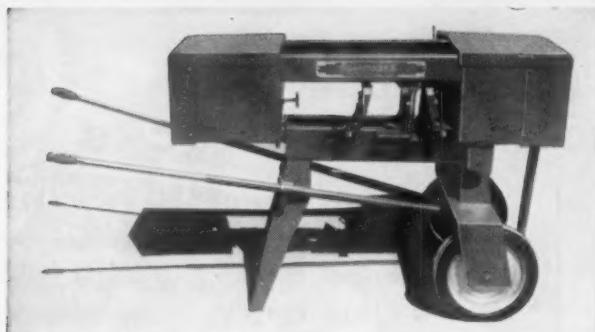
Cams cannot become loose or misaligned. The larger bulk permits uniformity in heat treating, thereby providing more ruggedness in the wheel and cam.

For more data circle 81 on Postpaid Card

TAKE IT TO THE JOB...

KALAMOBILE

**— a metal-cutting
band saw that's
truly portable —
handier than ever!**

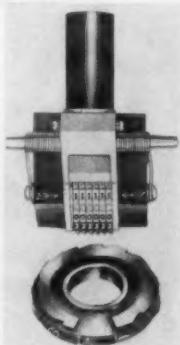


Here's the popular Kalamazoo Model 610 metal-cutting band saw on the handiest chassis you ever saw. Provides greatly increased portability with its rubber-tired 12-inch wheels and telescoping handles. One man shifts the 610 from job to job with ease. Capacity 6" Rounds—10" Flat.

610-D without coolant attachment.

610-W with coolant attachment.

Kalamobile chassis M6A fits all 610 models.



**George T. Schmidt
Numbering Head
and Wheel**

MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.

358 Harrison Street, Kalamazoo, Michigan

For more data circle 454 on Postpaid Card

*Now they call Joe a genius**



*
He's no Einstein—but he
figured how to cut costs
in half by switching to...

NEW T-J REAMERS with throw-away heads!

You don't have to be a wizard at figures to see how the new T-J Reamer with Throw-Away Head cuts your replacement costs to *less than half*. You save because you replace *only* the part that wears out. Buy original shank . . . change the head in a jiffy when worn. Wide range of head sizes from $\frac{1}{2}''$ to $2\frac{3}{4}''$ inclusive, in $1/16''$ increments available with right or left hand spiral flutes for thru or blind hole reaming.

Tapered hole in head insures concentricity and *new* thread design assures a snug fit on smoothly ground tapered shank. Reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief. It's a product of T-J's 39 years of know-how as one of the largest manufacturers of die sinking milling cutters. Tomkins-Johnson Co., 617 North Mechanic St., Jackson, Mich.

- 1-Cuts replacement cost to less than half!
- 2-Quick change of heads saves time.
- 3-Wide range of sizes.
- 4-Head and arbor firmly locked together.
- 5-Easy to change heads for different metals, increases efficiency.

For more data circle 455 on Postpaid Card

March, 1958



★ Exclusive, high potential territories open to responsible manufacturers' representatives. Write today!

T-J

TOMKINS-JOHNSON

DIVISIONS: AIR AND HYDRAULIC, CHEMICAL, CUTTING, PLATEWORK

new shop equipment . . .

**SELF-LOCKING SPRING
PINS MADE FROM
BERYLLIUM COPPER**

Self-locking spring pin fasteners, that are made of beryllium copper, are now being produced by the Standard Pressed Steel Co., Box 556, Jenkintown 22, Pennsylvania.

These Sel-Lok Spring Pins make available a vibration proof method of fastening with the added non-sparking, non-magnetic and high conductivity features of the beryllium copper alloy.

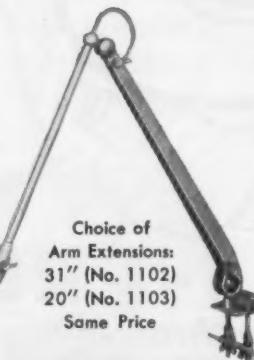
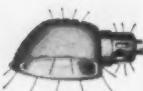
The Sel-Lok is an axially slotted tubular pin that locks by spring action when driven into an ordinary hole. The only assembly operations are the drilling of the hole and the driving of the pin with a hammer or press. Chamfered ends simplify starting and rounded edges along the slot prevent scored holes.

These spring pins are made in nominal diameter sizes ranging from 0.062 to 0.250 inch. Lengths range from 3/16 inch to 4 inches. Length tolerances range from plus or minus 0.015 inch to smallest sizes to 0.030 inch in largest sizes. Hardness is Rockwell C 36-42.

For more data circle 82 on Postpaid Card

**For Hard-to-Light Machines . . . New
Adjustable-Arm**

Air-Cooled
Dazors
with Side-Mounted
Reflectors



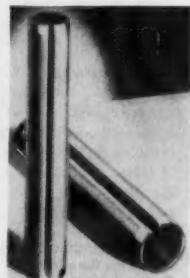
Now it's as easy to beam light into a recess, or around an offset, as onto a simple tool or bench position. This Adjustable-Arm Dazor with side-mounted reflector offers same low-cost air-cooled efficiency and positive tension control as top-mounted style. Uses 60-w bulb. Call your Dazor distributor. Dazor Manufacturing Corp. St. Louis 10, Missouri.



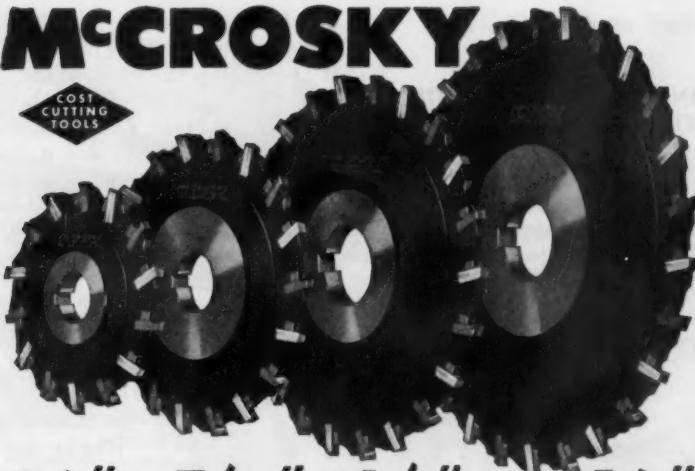
...Makers of

DAZOR FLOATING LAMPS

For more data circle 456 on Postpaid Card



McCROSKEY



$\frac{3}{8}'' - \frac{7}{16}'' - \frac{1}{2}''$ and $\frac{5}{8}''$

THIN SLOTTING CUTTERS

$4'' - 5'' - 6'' - 8'' - 10''$ and $12''$ in diameter

with Jack-Lock® Blade Locking Wedges

- Designed specially for milling thin slots accurately and efficiently. Jack-Lock wedges extend the full width of the body. Consequently, locking pressure is applied parallel to the sides of the body, assuring true running at all times. Cutting faces of the blades are milled and ground to provide the axial rakes required. Easily converted to a half-side mill by simply inserting blades all of one hand. Extra large hubs provide added ruggedness and rigidity. Easily mounted on a grinding arbor for resharpening. Unsurpassed performance. Write for a bulletin today!



McCROSKEY TOOL CORPORATION

MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

For more data circle 457 on Postpaid Card

new shop equipment . . .

CONTINUOUS SPIRAL POINTED TAP WITH MULTIPLE CHAMFERS

The Regal Jet Tap, recently introduced by Beloit Tool Corp., Beloit, Wis., offers a continuous spiral point tap with multiple chamfer sections.

Advantages of this tap center around a continuous spiral point. It forces

the lubricant to the cutting edge, thereby extending the life of the tap. It also pushes the chips ahead of the tap, eliminating the problem of chips clogging the flutes. Another feature of the Regal Jet Tap is that it is available with single or multiple chamfer sections, so that an entirely new cutting section, including the proper chamfer and spiral point grind, may be obtained without the necessity for resharpening equipment or replacing with a new tap. The manufacturer guarantees the Regal Jet Tap against breakage.

The tap is available in machine screw sizes 6, 8 and 10 for shallow hole depth threading. It is available in high speed steel and, also, with nitrite and chrome plating.

For more data circle 83 on Postpaid Card



BOX ANGLE IRON

Saves Valuable Layout, Inspection and Machining Time

This unusually versatile Taft-Peirce tool serves as both a universal right angle iron and box parallel.

Four sides open for convenient work-clamping, and for clamping Box Angle Iron to machine table or surface plate. Two solid faces for use as right angle iron.

Highly accurate and made from close-grained cast iron,

heat treated. Working surfaces are precision ground with overall dimensions held to size within .0005", opposite sides parallel within .00025" and adjacent sides square within .0005".

The Taft-Peirce Box Angle Iron will quickly pay for itself. Order one today and see for yourself. Send for T-P data sheet ST-002.

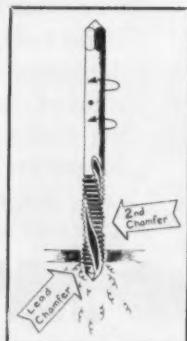
TAKE IT TO

TAFT-PEIRCE



WOONSOCKET, RHODE ISLAND

For more data circle 458 on Postpaid Card



Regal Spiral Point Tap

**INCREASES
PRODUCTION...**

LOWERS COSTS...

**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastic, and other materials—fast, accurately, and at very low cost. Only \$110.00*

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$ H.P., 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$38.00*

*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRAMATICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$110.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of *your* production problems.

Write today
for further
information.

H. B. ROUSE & COMPANY
2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

For more data circle 459 on Postpaid Card

new shop equipment . . .

HEAVY DUTY UPRIGHT DRILLING MACHINE

Western Machine Tool Works, Holland, Mich., has announced the Models No. 6-12 B.M. and No. 6-12 B.M.R. Heavy Duty Upright Drills. The No. 6-12 B.M. is a box column, rectangular table machine, available in 1, 2, 3 or 4 spindle

models, with either one adjustable table for all spindles, or separate adjustable tables for each spindle on the low base gang drills. The No. 5-12 B.M.R. and No. 6-12 B.M.R. are heavy duty, round column, round table machines and all No. 5-12 models are similar gear power feeds, and 5 horsepower individual motor drives to the heads.

Optional spindle speeds and a wide variety of accessory equipment is available. They are completely ball bearing equipped, with sealed ball bearings on all transmission and feed shafts.

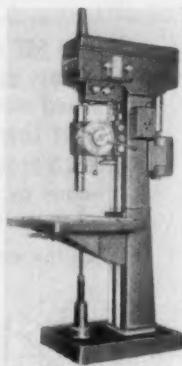
All feed and speed changes are through hardened sliding gears on multiple splined shafts, totally enclosed and running in oil.

For more data circle 84 on Postpaid Card

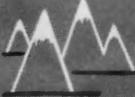
The advertisement features a large industrial dust collector unit. On the left, a circular metal drum is connected to a vertical pipe system. A prominent sign on the right side of the unit reads "DUST KOP" at the top, followed by "DUST COLLECTORS" in large letters, and "PLUS... ACCESSORIES OR FITTINGS" below it. At the bottom, a large rectangular box contains the text "A COMPLETE SYSTEM FROM ONE SOURCE". Above the main unit, a smaller sign says "DUSTKOP STOPS DUST" with a cartoon character holding a dustpan.

AGET offers more! Over 38 standard Dustkop models to choose from . . . Plus engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!

AGET MANUFACTURING COMPANY
1398 E. CHURCH STREET • ADRIAN, MICHIGAN
For more data circle 460 on Postpaid Card



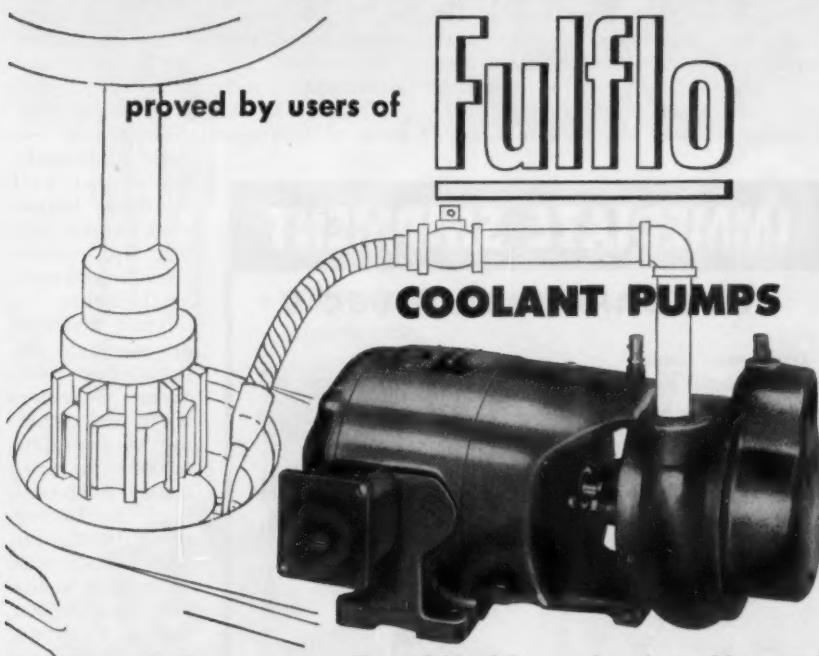
Western Heavy Duty Upright Drill

Cool Tool  Long Life 

proved by users of

Fulflo

COOLANT PUMPS



For trouble-free
hydraulic
**PRESSURE
CONTROL,**
install
FULFLO
Oil-Relief Valves



Pipe sizes
to 2½"
Pressures
to 500#

Dependable delivery of coolant adds to tool life. FULFLO Coolant Pumps are built to machine tool standards, provided with heavy duty bearings, for long, reliable service. The FULFLO pump line is comprehensive, practical, economical and efficient: Belt, direct and motor-driven models, right and left rotation, horizontal and vertical types with choice of bearings.



WRITE for "Fulflo Mechanical Data Book," handy reference to valves or pumps

THE FULFLO SPECIALTIES CO., INC.
416 Fancy Ave. • Blanchester, Ohio

For more data circle 461 on Postpaid Card

new shop equipment . . .

SPIRAL FLUTE REAMER IN STANDARD LENGTHS

The Atrax Co., Newington 11, Conn., has announced a standard length solid carbide chucking reamer (with steel shank) which features right hand spiral flutes. In this 1565-R Series, 17 tools are available, rang-



Atrax Solid Carbide Spiral Flute Reamer

ing in diameter from $\frac{1}{8}$ to $\frac{3}{4}$ inch, overall length from $3\frac{1}{2}$ to $9\frac{1}{2}$ inches. There are four flutes in fractional sizes $\frac{1}{8}$ through $\frac{1}{4}$ inch; six flutes on reamers from $9/32$ through $\frac{3}{4}$ inch. Features of this spiral flute reamer include its straight shank for full chucking, brazed solid carbide cutting tip, radius chamfer and right hand cutting.

Atrax Reamers are made to the following tolerances: diameters up to and including $\frac{1}{4}$ inch plus 0.0002, minus 0.0000; $9/32$ to $\frac{1}{2}$ inch inclusive, plus 0.0003, minus 0.0000; $9/16$ to $\frac{3}{4}$ inch inclusive, plus 0.0004, minus 0.0000. Shank diameter tolerance, all sizes, is plus 0.0005, minus 0.0005.

For more data circle 85 on Postpaid Card

★ m m s ★

HIGH SPEED STEEL SPADE DRILLS

Designed to expedite production of holes in heat treated alloy steels, stain-

IMMEDIATE SHIPMENT

TOOL CARRIER No. 203C-D

Don't waste valuable time looking everywhere for your tools, jigs, and other items you must have at hand. Keep them handy and safe—move them where you need to. Carrier 18" x 24" x 34" high with $2\frac{1}{2}$ " steel or hard rubber casters (specify). Drawer 15" x 23" x $4\frac{3}{4}$ " high. Can be padlocked if desired.

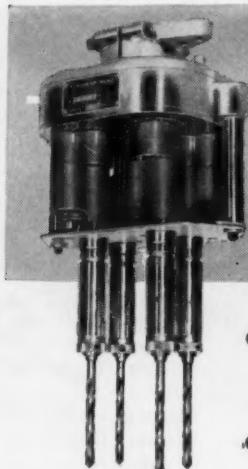


\$21.93

PRICES F. O. B. FACTORY OR WAREHOUSE PHILADELPHIA
COMPLETE SHOP BOX AND SHOP EQUIPMENT CATALOG ON REQUEST
PHONE: BALDWIN 9-1805

BAY PRODUCTS INC.

3015 N. 16TH ST. • PHILADELPHIA 32, PA.
For more data circle 462 on Postpaid Card



Adjustable, Multiple-Spindle Drill Head

Specify WISCONSIN HEADS for High Speed Production Drilling, Tapping, Boring or Reaming...

- **WISCONSIN** Multiple Spindle Adjustable Drill Heads, Custom Built Adjustable and Fixed Center Types.
- **WISCONSIN** Tapping Heads and Lead Screw Tapping Units.
- **WISCONSIN** Standard and Index Bases.
- **WISCONSIN** Special Machines.



Wisconsin
Rotating
Drill Head
with planetary
gear drive

Model LA 2-Spindle
Tapping Head

↑
Model TU-415
Automatic Lead
Screw Tapping Unit

Write for Illustrated Literature



WISCONSIN DRILL HEAD CO.

4983 NORTH 124th STREET • BUTLER, WISCONSIN
For more data circle 463 on Postpaid Card

new shop equipment . . .

less steel, titanium and other types of hard to machine metals and castings are spade drills, recently announced by Robert H. Clark Co., 9330 Santa Monica Blvd., Beverly Hills, Calif. The replaceable spade type drill blades are made of the M-3 type, high speed steel. Long blade life is insured by

Clark M-3 High Speed Steel Spade Drill

coolant circulated internally, through the shank and directed outwardly against each cutting edge. Each shank accommodates a number of individual

blade sizes. The design of Clark Spade Drills provides ample chip clearance and has the advantage of being easily reground to smaller diameters when edges become worn. Available sizes at present range from 1-1/16 to 5 inches o.d. with other sizes beyond this range available on special order.

For more data circle 86 on Postpaid Card

★ m m s ★

**SHELVING
INSERT FOR
TOOL STORAGE**

Bay Products, Inc., 3015 North 16th St., Philadelphia 32, Pa., has announced production of shelving insert No. 5002. It offers convenient storage of drills, tools and taps. Label holders are provided on each shelf. Insert

**CUT
ASSEMBLY
COSTS**

with this



Bellows AIR PRESS

Arbor stand can be combined with any model Bellows Air Motor of 1½", 1¾" or 2½" bore to form a compact, rugged air press. Ram clearance 6", throat 5", base plate 6" x 9". Base plates are ground flat both sides and are interchangeable.

Write for Bulletin MS-5RA.
Address Dept. MMS-35B.

1009-B



The Bellows Co.

UNIVERSAL INTERNATIONAL BASIC ECONOMY CORPORATION
AKRON 9, OHIO

For more data circle 464 on Postpaid Card

NOBLEWEST

Automatic

NUMBERING HEADS

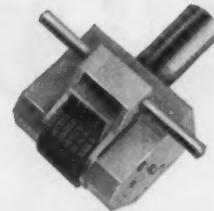
Model 484—New 20 digit lever-indexing automatic numbering head with unique air cylinder operation.

STANDARD OF THE MARKING INDUSTRY

NOBLEWEST Numbering Heads are unsurpassed in precision, speed of operation and long life for every kind of permanently indented numbering. Made for use in either marking presses or Noblewest Roll Marking Machines, they are available in a wide range of automatic, non-automatic and lever operated models, a few of which are illustrated here. Applications are unlimited for constant, selective or consecutive (serial) numbering. Special numbering heads are designed and made for any requirement, including embossing heads.

Send for Numbering Head Catalog containing complete technical information. Noble & Westbrook Manufacturing Co., 25 Westbrook Street, East Hartford 8, Connecticut.

**Visit Noblewest MARK-O-RAMA—Booth 837—
at the Tool Engineers' Show**



Model 10—Standard Automatic Numbering Head.
Carried in stock in 6 and 7 wheels. Number sizes:
 $\frac{1}{16}$ - $\frac{3}{32}$ - $\frac{1}{8}$ - $\frac{5}{32}$ - $\frac{3}{16}$.

MARK IT BEST WITH

NOBLEWEST

For more data circle 465 on Postpaid Card

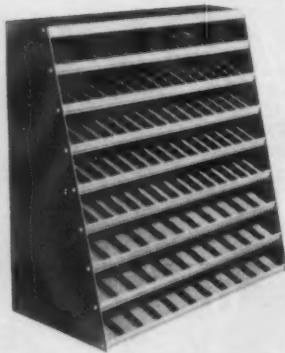
March, 1958

modern machine shop 227



MARKING
NUMBERING
EMBOSSING
GRADUATING

new shop equipment . . .



Bay Shelving Insert for tool storage

tapers from 7½ inches at the top to 17 inches at the bottom are available. The size of these shelving inserts is 33½ by 34½ by 17 inches.

For more data circle 87 on Postpaid Card

★ modern machine shop ★

HOOK TOOTH BANDSAW FOR NON-FERROUS MATERIALS

A hard edge, flexible back bandsaw blade, recently introduced by The L. S. Starrett Co., Athol, Mass., has positive rake hook teeth of improved design which cut with a smooth, clean shearing action that requires less feed pressure.

The teeth are scientifically designed for uniform stress distribution to

You Can
Rely on a

ROUSSELLE



THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rouselle Presses

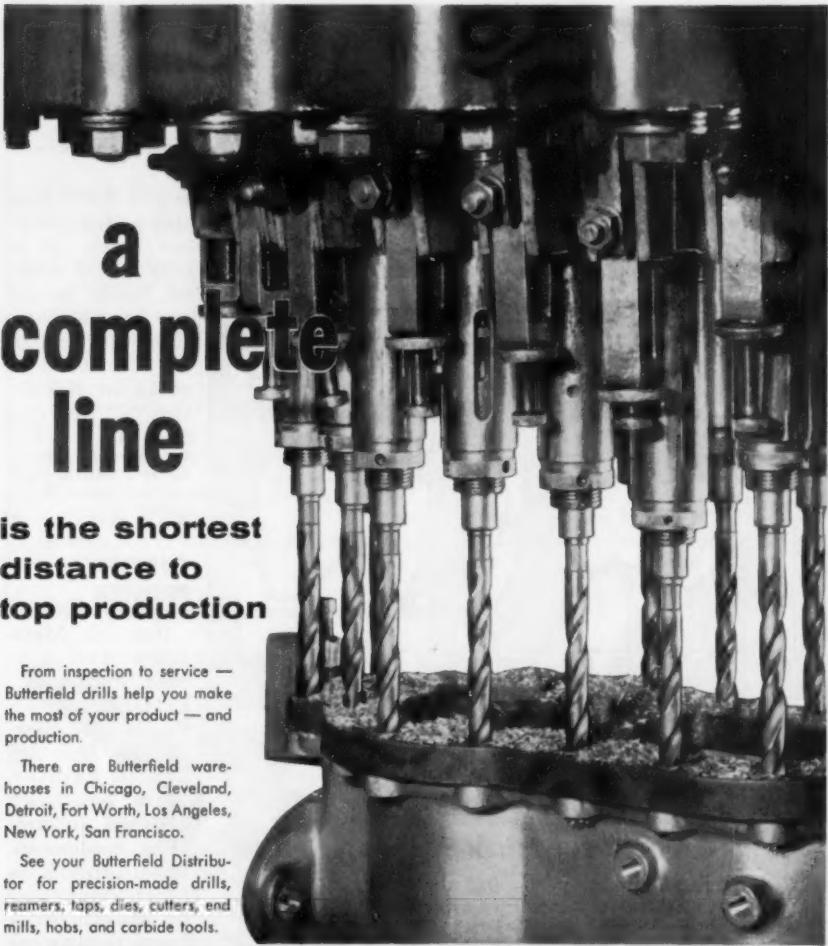
SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.

For more data circle 466 on Postpaid Card

Significant savings
may result if you let
our engineering staff
assist you. There is no
obligation.

Rouselle Presses are
sold exclusively
through leading
machinery dealers.

Choice of 25 models
in 5 to 40-ton sizes.



a complete line

**is the shortest
distance to
top production**

From inspection to service —
Butterfield drills help you make
the most of your product — and
production.

There are Butterfield ware-
houses in Chicago, Cleveland,
Detroit, Fort Worth, Los Angeles,
New York, San Francisco.

See your Butterfield Distribu-
tor for precision-made drills,
reamers, taps, dies, cutters, end
mills, hobs, and carbide tools.

BUTTERFIELD

... the cutting tools that make the most of your product

BUTTERFIELD DIVISION, UNION TWIST DRILL COMPANY, DERBY LINE, VERMONT

For more data circle 467 on Postpaid Card

new shop equipment . . .

permit heavier feeds for faster cutting. Rounded gullet construction is said to insure efficient chip flow and greater chip removal without clogging.

Recommended for fast cutting of non-ferrous metals, special compositions, fibre, Bakelite, plastics, wood and similar materials, this hook tooth



L. S. Starrett Hook Tooth Bandsaw Blade

bandsaw is claimed to give faster production and longer blade life while producing a smoother finish. It is available in individually boxed welded bands to fit any bandsaw machine and in 100, 250 or 500 foot coils in handy safety pullout cartons.

For more data circle 88 on Postpaid Card

★ m m s ★

**OFFSET
PRINTER**

Jas. H. Matthews and Co., 3944 Forbes St., Pittsburgh 13, Pa., is now offering its No. 248 Offset Printer, which has been designed to provide continuous, lineal printing on steel, aluminum or plastic pipe bars, tubing or other similar products. Mounted directly over a moving production line, this versatile unit is capable of printing on an unlimited range of product sizes from $\frac{1}{2}$ inch outside diameter.

CHICAGO INDUCTION HARDENED PRESS BRAKE DIES

Heavy lines indicate hardened surfaces

**for greater die life—
at no extra cost—
on any make press brake**

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO induction-hardened dies for your next press brake job.

Steel Bending Brakes For Over Fifty Years

4901

DREIS & KRUMP
MANUFACTURING COMPANY

7418 S. Loomis Blvd., Chicago 36, Illinois

For more data circle 468 on Postpaid Card

CHICAGO
STEEL BENDING BRAKES
ROD AND PAN BRAKES
PRESS BRAKES

AUTOMATIC COMPENSATION FOR MISALIGNMENT WITH EMPIRE FLOATING TOOL HOLDERS AND TAP HOLDERS

Check These Exclusive Empire Floating Tool Holder Features:

- Automatically compensates for both angular and parallel misalignment.
- Eliminates bell mouthed and over-sized holes—permits extremely close tolerance work.
- Free and easy movement . . . tool holder sleeve and shank float independently of each other.
- Amount of float is infinitely adjustable.
- Smoother running . . . moving parts ride on rollers.
- Minimum of maintenance . . . holder has only five parts.

TOOL HOLDER



TAP HOLDER



Standard equipment with leading Machine Tool Manufacturers. Tool Holders and Tap Holders are available with either straight or tapered shanks.

Check These Exclusive Empire Floating Tap Holder Features:

- Automatically corrects parallel and angular misalignment.
- Designed to prevent freezing under tension—taps float in and out.
- Wide range of float—simple adjustment lock-nut provides accurate control of degree of float.
- No springs or pivot members to restrict float.
- Floatation feature makes it easier to hold close tolerances.

EMPIRE TOOL COMPANY

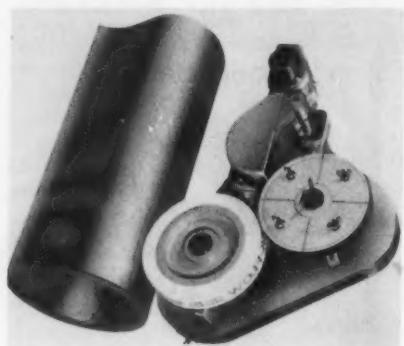
8776 GRINNELL AVENUE • DETROIT 13, MICHIGAN

For more data circle 469 on Postpaid Card

March, 1958

modern machine shop 231

new shop equipment . . .



J. H. Matthews No. 248 Offset Printer

Utilizing the offset principle of printing transfer, the No. 248 is cap-

able of continuous printing speeds as high as 1,000 feet per minute. This means that in one eight hour shift as much as 50,000 feet of material can be printed with pertinent data such as trademark, date, coil number, size, gauge and weight per foot.

The offset printing feature also permits the use of larger character sizes, because the rubber printing roll readily conforms to the radius of the material being marked. Two sizes of type wheels are available, providing a wide range of marking lengths.
For more data circle 89 on Postpaid Card

★ modern machine shop ★

BORING MACHINE FOR ALUMINUM DIE CASTINGS

A special purpose, three station precision boring machine, for machining

CUT PRODUCTION COSTS!

MARK
NAME PLATES
5 TIMES FASTER

WITH—*Automark*
ELECTRIC TAG MARKING MACHINES

MODEL EMT-2
ELECTRIC TAG TYPEWRITER

A touch of the finger delivers up to 2 tons pressure for deep, legible impressions in plastic or metal tags.

MODEL SRST-2
HI-SPEED TAG MARKING MACHINE

Automatically marks BOTH constant and serial numbers at any desired speed up to 8,000 tags per hour!

MANUFACTURERS' AGENTS
Some Territories Still Available

DEFIANCE MACHINE & TOOL COMPANY
1920 S. VANDEVENTER • DEPT. MM • ST. LOUIS 10, MO.

SEND
for
BULLETIN

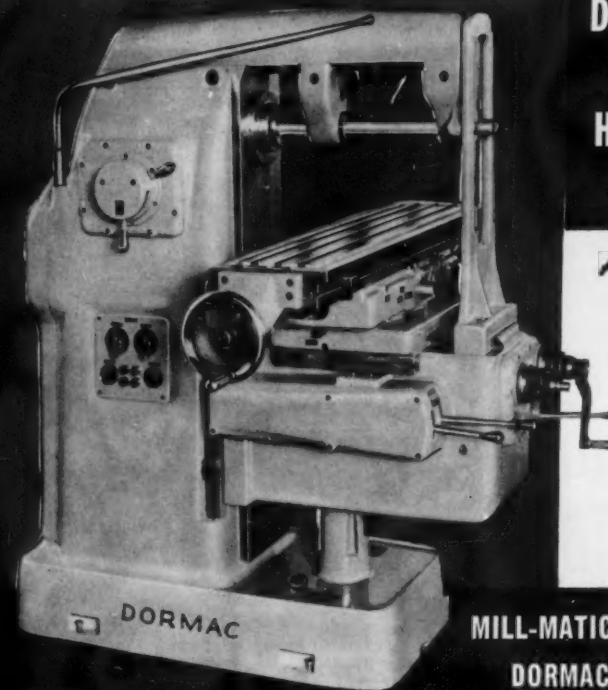


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**DORMAC • MILL-MATIC
DIAL TYPE
High Speed Universal
Milling Machines**

**ACCURATE • DURABLE
EASY TO OPERATE**

National Standard Taper
High Speed - Dial Type
Power feed in all directions
Hardened and ground gears
Power rapid traverse in
all directions
Chrome Nickel Spindle
Made in Table Sizes:
48"x11" to 60"x12"



MILL-MATIC-48"x11" Table Size...\$4390

DORMAC-60"x12" Table Size...\$5350

PRICES INCLUDE ALL STANDARD EQUIPMENT:

1 Main Motor — 1 Feed Motor — 1 Motorized Coolant System — 1 Arbor —
1 Brace — 2 Arbor Supports — 1 Draw-in Bolt — V-Belts — Climb Milling
Arrangement — Set of Wrenches.

DEALER INQUIRIES INVITED

INDEX INDUSTRIAL CORPORATION

150-MM BROADWAY

• NEW YORK 38, N. Y.

• BEEKMAN 3-4540



HOW GOOD ARE YOU?

What would YOU do?

... if you were in a bathroom with the water running and the handle of the water faucet broken off — the door locked with key on outside — no windows — no way out!

You are standing on the edge of the tub and the water has reached your head ??? Attach your solution to your letterhead or business card and mail to INDEX. If you're right, we'll send you a "Genius Award".



RELAX EACH MONTH WITH THE INDEX "PROBLEM CORNER"

new shop equipment . . .

aluminum die castings, has been built by Greenlee Brothers and Co., 1892 Mason Ave., Rockford, Illinois.

The machine consists of three standard Greenlee Model S-6 Hydro-Borers mounted on a welded steel base. Two of the boring units are equipped with an air operated, rapid approach

arrangement, which has been designed to quickly advance the boring spindle to the workpiece. The part is manually loaded into a stationary fixture and is held in position by a quick locking device, while the three holes are being bored simultaneously.

The right and left hand units are equipped with combination boring heads which face, counterbore and bore the two side holes in alignment

KENCO 8-TON PRECISION-BUILT PUNCH PRESSES

MODEL 8



*... rugged, fast and
trouble-free*

They're Kenco-built with long-wearing parts throughout to eliminate downtime and give you many extra years of steady, low-cost production. Rigid, multiple-rib frames and extremely long ram ways assure high precision production. Driving mechanism engineered for trouble-free operation. Press is competitively priced.

*Model 8-R—8-ton
deep-throat,
Rigid-Rib*

Same construction features, but with 12 $\frac{3}{4}$ " throat, and tremendous resistance to breakage, deflection, or torsional twist.



Kenco presses—14 models—2 to 15 tons
Write for literature

KENCO MANUFACTURING CO.

5211 Telegraph Road, Los Angeles 22, California

For more data circle 472 on Postpaid Card



FOR LESS THAN \$50 YOU GET 12 SETS, EACH SET GROUND READY TO GO

Men would not accept either idea at first **INSERT CHASERS SAVE UP TO 33%**

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$50 you get a dozen sets of $\frac{3}{4}$ —16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

free: "Unified and American Screw Thread Digest"

THE EASTERN MACHINE SCREW CORPORATION

40-50 BARCLAY ST.

NEW HAVEN, CONN.

For more data circle 473 on Postpaid Card

March, 1958

modern machine shop 235

for speedy, economical production . . . use

AIRETOOL pneumatic tools

Designed for rugged, continuous service. Won't heat up or stall. Light, easy to handle and maneuver . . . simple operation . . . minimum maintenance.



Vertical Grinders for fine finishing, sanding, polishing. 4" to 8" wheel.



Lightweight Production Drills. Up to 1/4". 2600 to 38,000 RPM.



Heavy Duty Drill. 1/2", 5/8" and 3/4" capacity.



Midget Die Grinder for intricate grinding. 38,000 and 60,000 RPM.

Write for Airetool Pneumatic Equipment Catalog No. 63.

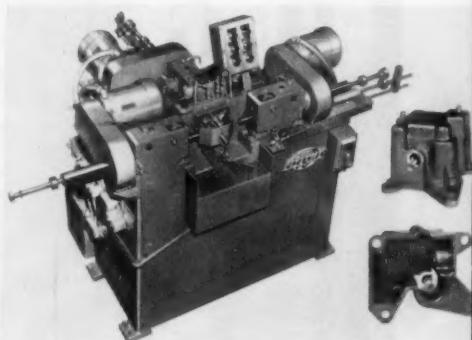


Canadian Plant:
37 Spalding Drive
Brantford, Ontario
European Plant:
Vlaardingen
The Netherlands

For more data circle 474 on Postpaid Card

236 modern machine shop

new shop equipment . . .



Greenlee Special Precision Boring Machine

with each other. The rear unit bores and faces the internal hole in relation to the two side holes. The parts are loaded, machined and unloaded in a cycle time of 30 seconds, or at a gross production rate of 120 pieces per hour. Other features of this machine include an automatic operating cycle, pushbutton control for retraction of boring spindles at any point during rapid approach or machining cycle and individual control at each station for tool setting, adequate coolant and chip disposal.

For more data circle 90 on Postpaid Card

GRIND THE
Eastern Centerless Way

WE SPECIALIZE
20 CENTERLESS GRINDERS
ESTABLISHED 1939

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 475 on Postpaid Card

March, 1958

Webber Gage Blocks

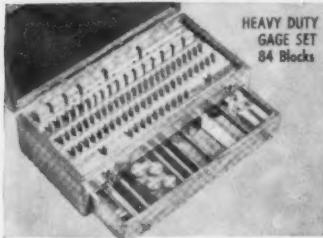
Insure the Accuracy Essential To Mass Precision Production

Making Webber Gage Blocks is a science—a combination of human skill and the world's finest mechanical and laboratory equipment, both highly specialized. Only with such a combination can gage blocks be made to meet the high standards which Webber steadfastly maintains. Webber can fill your every gage block need, with the most complete line of gage blocks and related accessories.



In 88, 85, 84, 81, 36, and 34 Block Sets
Accuracies, both steel and Croblox,
"B" + .000006 "A" + .000004
-.000002 -.000002

Illustrated — Set No. 88A with Accessories



WEBBER ACCESSORIES — permit using gage blocks directly as snap or ring gages, scribers, and with a base block, as a height gage.



WEBBER TEMP-CHECK
Essential wherever accurate control of temperatures is a must.
Measures liquids, gases or solids. 4 Models.



Webber
GAGE COMPANY

12899 Triskett Rd. • Cleveland 11, Ohio

LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS

For more data circle 476 on Postpaid Card

March, 1958

modern machine shop 237

**Because
They Cut
Longer . . .**

. . . and produce more pieces with finer finishes in less time, Pratt & Whitney End Mills cost you far less in the long run. Correctly designed by men who know machine tools as well as cutting tools, they're carefully manufactured from selected steels, expertly heat treated, precision ground and rigidly inspected. Write now for complete information.

END MILLS

AVAILABLE FROM STOCK IN A COMPLETE RANGE OF TYPES AND SIZES AT THE PRATT & WHITNEY BRANCH OFFICE NEAR YOU

For more data circle 477 on Postpaid Card

new shop equipment . . .

**PRESS BRAKE FEATURES
LARGE DIE AREA**

Dreis and Krump Manufacturing Co., 7418 South Loomis Blvd., Chicago 36, Ill., has developed a modified design of its light duty Chicago Press Brake as a standard machine for producing light stampings.

The machine is provided with a wide bed and ram, giving a die area of 36 by 77 inches, has a stroke of 3 inches, a speed of 40 strokes per minute and is driven by a 3 h.p. motor. Simple design and rugged all welded steel construction combine to give this 30 ton capacity machine a large die area. For more data circle 91 on Postpaid Card



Chicago Press Brake for form cutting

THREE TON POWER BENCH TYPE PUNCH PRESS

The Model B-3 Three Ton Power Bench Type Punch Press is now available from Alva Allen Industries, Dept. MM, Clinton, Missouri.

This press can easily be adapted for any standard punching operations within its rated capacity. It can punch, shear, form, blank, cut and draw materials such as metal, leather, fibre, textile, plastics and paper. On continuous operation, the Model B-3 will mass produce up to 300 articles per minute. This press is rugged and durable and has single pin quick action clutch with simple, positive, non-repeat or repeat action. Straight ram guides, with flat gib, give accurate fitting of dies for precision operations and the simple, accurate ram adjustment with positive lock is an additional feature. The standard stroke is 1 inch with $\frac{1}{4}$ to $1\frac{1}{2}$ inch strokes avail-



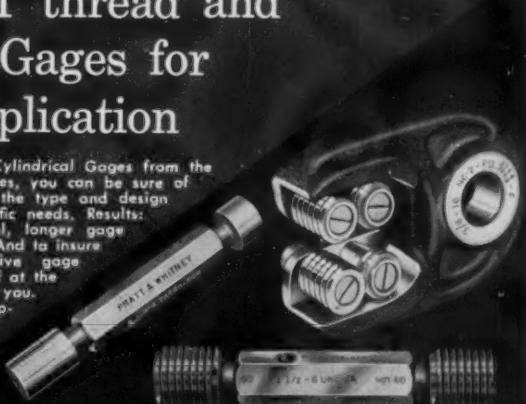
Alva Allen Model B-3 Three Ton Punch Press

able. The total weight is 123 pounds, excluding the motor. The vee belt drive requires a 1/3 h.p. motor.

For more data circle 92 on Postpaid Card

The RIGHT thread and cylindrical Gages for EVERY application

When you select Thread or Cylindrical Gages from the complete Pratt & Whitney lines, you can be sure of the finest gage quality plus the type and design exactly right for YOUR specific needs. Results: more effective quality control, longer gage life, and lower gaging costs. And to insure prompt service, comprehensive gage stocks are carried on the shelf at the P&W Branch Office near you. Write today for fully descriptive literature. Pratt & Whitney Company, Inc., 25 Charter Oak Boulevard, West Hartford, Connecticut.



PRATT & WHITNEY
FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 478 on Postpaid Card

**Produce
MORE
Holes... Accurately
Threaded**

because these taps ARE accurate . . . with squares, shanks, threads, OD's and centers. Correctly designed for fast, free cutting. Heat treated for longer life. Write for complete information. Ask about the custom tap service P&W offers you at no extra cost!

PRATT & WHITNEY TAPS
A COMPLETE RANGE OF TYPES AND SIZES IS AVAILABLE
FROM STOCK AT THE P & W BRANCH OFFICE NEAR YOU.

For more data circle 479 on Postpaid Card

new shop equipment . . .

**DRILLING HEAD IS
AVAILABLE IN SIZES
UP TO 12 SPINDLES**

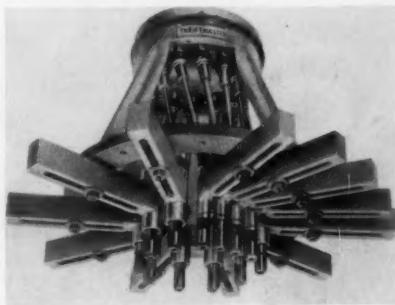
Universal Joint Type Drill Heads, in standard sizes up to 12 spindles, are now being built by the Thriftmaster Products Corp., 1034A North Plum St., Lancaster, Pennsylvania.

Full ball bearing construction is standard on these Thriftmaster models but, for close center distance operations, bronze bearing mounted spindles can be supplied.

The full ball bearing and bronze bearing spindles are interchangeable in order to provide complete flexibility in drilling to patterns. Any Thriftmaster Universal Joint Type Drill Head

may be furnished with a full ball bearing gear housing and bronze bearing spindles to meet close center distance requirements.

For more data circle 93 on Postpaid Card



This Thriftmaster Universal Joint Type Drill Head has 12 spindles, eight with ball bearing construction and four with bronze.

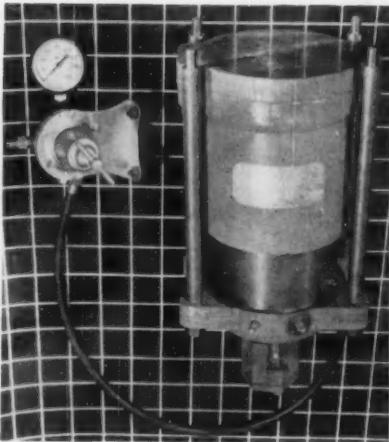
UNIVERSAL PNEUMATIC DIE CUSHION

New design and construction of a full universal pneumatic die cushion, adaptable to all power presses, is now in production by the Dayton Rogers Manufacturing Co., Minneapolis 7D, Minnesota.

It has a full universal application and can be applied to all power presses, not only for all deep drawing requirements, but well adapted to the pressure pad control on all forming dies, ejection requirements and other details on die design.

This design is of all steel construction and comes complete with combination pressure gage and reducing regulating valve, all necessary fittings —ready to install—with a hardened and ground pin pressure pad to fit the press bed opening.

It is made in sizes from 4 to 8 inches, with ring holding pressures



Dayton Rogers Pneumatic Die Cushion

from $\frac{1}{2}$ to 900 tons, developed from the average shop airline pressure.

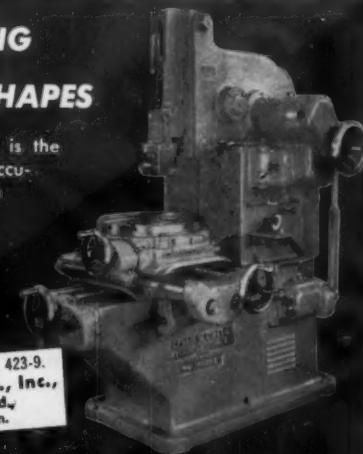
For more data circle 94 on Postpaid Card

FASTER, EASIER HANDLING FOR IRREGULAR WORK SHAPES

THE PRATT & WHITNEY VERTICAL SHAPER is the handiest machine in any shop. Powerful, accurate and versatile, it is much more than a slotted . . . handles a wide variety of irregular shapes with speed, precision and economy. Vertical design eliminates springing, insures permanent accuracy. Cutting action helps to hold work in place.

Supplied in 2 sizes with 6" and 12" ram strokes.

Write now for Circular No. 423-9.
PRATT & WHITNEY Co., Inc.,
25 Charter Oak Blvd.,
West Hartford, Conn.



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 480 on Postpaid Card

new shop equipment . . .

NUMBERING HEAD

The Noble and Westbrook Manufacturing Co., 25 Westbrook St., East Hartford 8, Conn., has announced a major achievement in the development of a new type of automatic numbering head. Designated as the Model 484, this head combines five unique features. It was designed for roll mark-

ing a 20 digit number into flat work-pieces with a permanent indented impression in a curved line. The head is used in a general purpose roll marking machine.

The Model 484 is basically automatic in operation, such that indexing occurs after each roll marking stroke to give consecutive serial numbering. This indexing is accomplished by a small 1½ inch bore air cylinder, operated directly from the marking machine cycle.

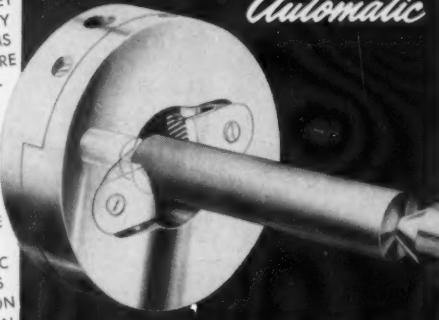
In addition to the automatic operation, the head is equipped with a total of 20 indexing levers, in two banks, for manual indexing of all wheels including those wheels which are also indexed automatically by the air tripper.

The Model 484 is a rocker style, with a barrel shaped wheel assembly for roll marking on flat surfaces. The head itself pivots on the dovetail shank pivot pin during the roll

**USED BY
INDUSTRIAL
LEADERS**

LUFKIN FOUNDRY
GENERAL ELECTRIC
JOHNSON MOTORS
FAIRMONT STEEL
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PRATT & WHITNEY
REMINGTON ARMS
FORD JOHN DEERE
BETHLEHEM STEEL
LIELAND ELECTRIC
INGERSOL RAND
J. I. CASE CO.
RHEIM MOTORS
WESTINGHOUSE
INTERNATIONAL
CUMMINS ENGINE
DETROIT DIESEL
BENDIX PONTIAC
HYATT BEARINGS
CADILLAC ALLISON
CHRYSLER NORTON
LANDIS TOOL
LODGE & SHIPLEY
WAUKESHA MOTORS
SARGEANT & CO.
CHELSEA PRODUCTS
MASTER ELECTRIC
NEW PROCESS GEAR
DANA MONARCH
GOULD PUMP

**SENECA
FALLS**
Automatic



**WORK
DRIVER**

DRIVES ANYTHING BETWEEN CENTERS

NEW JAWS with angular serrations . . .
SELF-ADJUSTING to work eccentricity . . .
PREVENTS strain on head center . . .
SAFER—no projecting parts to injure operator . . .
FASTER—saves time, one operator can attend several machines. Models for all machines. Sizes for ¼" to 6 7/8" work diameter; Priced from \$81. Write for Bulletin D-57 for complete information.

BETTER TOOLING SINCE 1864 SENECA FALLS MACHINE CO.

Seneca Falls, N. Y.

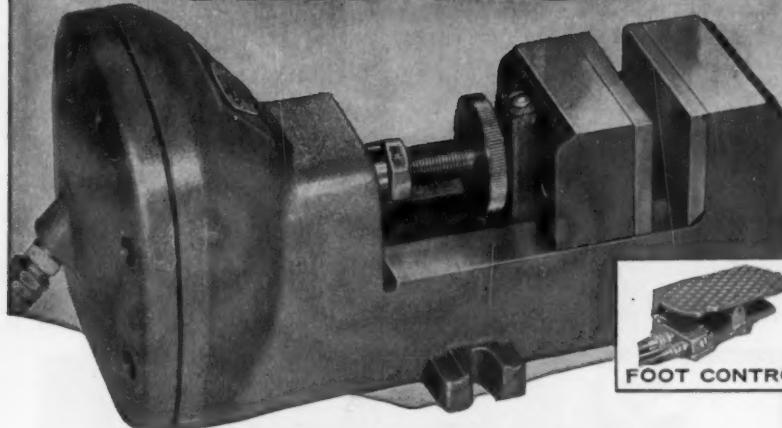
For more data circle 481 on Postpaid Card



Noblewest Automatic
Numbering Head

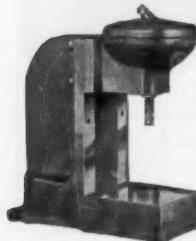
Speedy

AIR VISE



HIGH SPEED • POWERFUL GRIP

New, improved model speeds up all repeat operations—*milling, drilling, tapping, punching, bending, riveting*. Both hands left free to produce more! Light squeeze to 2250 pounds pressure! Extra thick jaws for attaching jigs. Jaws open to 3 inches; $\frac{1}{16}$ " to $\frac{5}{8}$ " maximum travel. With foot control and air hose. **\$44.00**



SPEEDY T-TON AIR PRESS
Does the work of expensive presses! 5-inch throat; Ram 0 to 5"; stroke $\frac{3}{8}$ "; table 5" x 5". Operated by foot or our fingertip controls. \$85.00

SPEEDY AIR RAM NO. 70

Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. 6 $\frac{1}{2}$ " high, 5 $\frac{3}{4}$ " wide. \$35.00



Order from Your Supplier or Write for Air Tool Catalog

W. R. BROWN CORP., 2669 N. NORMANDY AVE., CHICAGO 35, ILL.

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

For more data circle 482 on Postpaid Card

new shop equipment . . .

marking stroke. The head is also unique in that engraving on each wheel is off center, so that the roll marked impression is on a curve or radius. For more data circle 95 on Postpaid Card

★ modern machine shop ★

BENCH TYPE TAP GRINDER

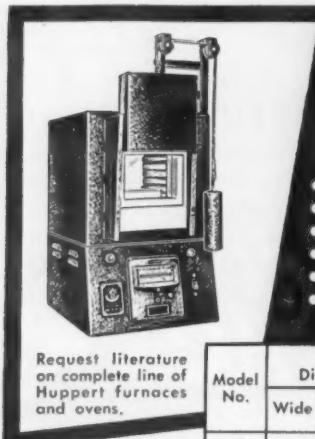
R. W. Good Sales and Engineering Co., Inc., 3824 South Calhoun St., Fort Wayne, Ind., recently announced the availability of its Faudree Tap Grinder, the purpose of which is to grind the chamfer on taps.

This machine grinds and radially relieves the tap on the chamfer in relation to the angle from the axis of the tap. All of the cutting edges of



Faudree Bench Type Tap Grinding Machine

the complete chamfer are sharpened at the proper angle—each lead thread will cut, distributing the load as it



Request literature
on complete line of
Huppert furnaces
and ovens.

* For 2300° F. add \$95.00 to No. 11 and No. 12, and \$105.00 to No. 12A. No. 12A can be furnished for 3 phase at no additional cost. For floor model add \$52.00 to above prices. No. 869 standardly supplied for 2200° F.

Be sure of Maximum Heat Treating Efficiency with **HUPPERT FURNACES**

- Range: 300° F. to 2000° F.
- High temperature, heavy-duty Kanthal elements
- Multi-insulation
- Counter-weighted, tight-sealing door
- Operational pilot light
- Shipped ready to operate

Model No.	Inside Dimensions			KW	Prices	
	Wide	High	Deep		With Huppert Input Controller	With Electronic Temp. Controller
869	8"	6"	9"	4	\$296.00	\$480.00
11*	8"	6"	12"	4	306.00	518.00
12*	8"	8"	12"	6	382.00	590.00
12A*	8"	8"	18"	9	490.00	698.00

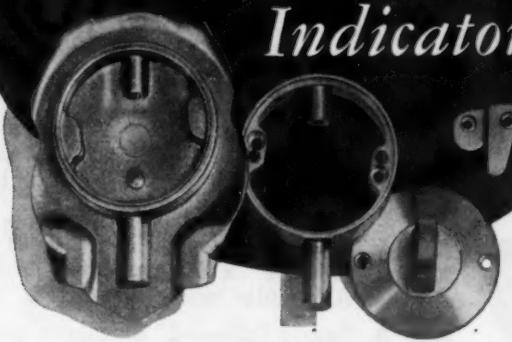
K. H. HUPPERT CO.
Manufacturers of Electric Furnaces and Ovens

6841 Cottage Grove Ave., Chicago 37, Illinois

For more data circle 483 on Postpaid Card

AMES

*...the preferred Dial
Indicators...*



have forged cases, backs and wheel supports
for maximum stability

The extreme care put into the design and material selection of component parts typifies the Ames approach to manufacturing a superlative product. It's just one of the reasons why so many quality control engineers specify Ames Dial Indicators as "preferred". Write today for complete information.

Representatives in principal cities



B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS
For more data circle 484 on Postpaid Card

March, 1958

modern machine shop 245

new shop equipment . . .

should. The machine will handle all taps, including spiral, having up to ten flutes and diameters to 2 inches right or left hand.

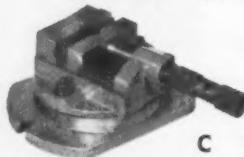
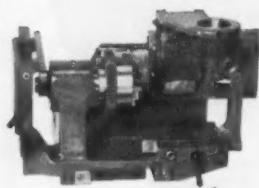
The overall dimensions of the tap grinding machine are: 24 by 18 by 22 inches in height; the weight is 400 pounds. This is a bench type machine.

The grinder is precision built throughout and has hardened and ground ways protected by accordion type dust covers.

The radial relief is generated on the chamfer by cams contained in the head. The amount of relief can be varied and is readily checked by an indicator, which is mounted at the side of the head.

For more data circle 96 on Postpaid Card

Increase Production Capacity Of Die Sinkers & Engravers



With These ALEXANDER Attachments

Add to the versatility of Alexander and other types of die sinkers and engravers with these precision attachments.

- A. Rotary Engraving Attachment for max. 4" x 7" workpieces. Fits Alexander and other makes.
- B. Rotary Table—9" diameter, graduated for 360°, locking device.
- C. Swivel Vise—can be swung on graduated base through 360°.
- D. Dividing Head with 4" universal chuck, fine rotary adjustment.

Also a complete line of Alexander Die Sinkers, Engravers, Cutter Grinders and Optical Equipment.

Write For Catalog C

J. ARTHUR DEAKIN & SON

150-28 Hillside Avenue Jamaica 37, New York

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BAY STATE TAPS and DIES!

On the nearby shelves of your Industrial Supply Distributor

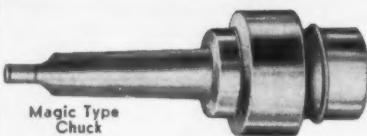


Your local Industrial Supply Distributor . . . is your neighbor • knows your needs, product-wise and service-wise • knows proper tool applications • stocks types and sizes to suit area demands • stocks locally, delivers promptly • and aids your community

BAY STATE TAP & DIE COMPANY • MANSFIELD, MASSACHUSETTS
For more data circle 486 on Postpaid Card

March, 1958

modern machine shop 247



Magic Type
Chuck

THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

"Call Collis For Service"
THE COLLIS CO.

Dept. A, Clinton, Iowa

For more data circle 487 on Postpaid Card

new shop equipment . . .

CUTTING TOOLS IMPROVE FINISH

Metal Cutting Tools, Inc., 350 South Water St., Rockford, Ill., recently announced a line of special cutting tools with an improved matched holder and cutter shank design, which is said to assure the greater strength and rigidity that are essential in maintaining accurate alignment required for today's mass production work. Based on the clutch drive principle, these tools feature Taper-Torque Drive. Strong, on-center drive lugs provide an equal distribution of the radial driving force between the holder and the tool.

Greater rigidity is also achieved with the Taper Torque design which reduces tool chatter and permits a smooth flow of power, even on rough, interrupted surfaces. This increased rigidity helps to prevent contact shock from back-turn and gives more pieces per tool grind.

The taper design of the tool shank is said to assure accurate positioning and alignment of the tool in the holder without exerting any driving force on it. All power is transmitted through the on-center drive lugs. There are no internal machined sections, springs, lugs or balls inside the holder to cause maintenance expense after the tools are in operation. A cam type drift tool

Rowbottom for Cams

ROWBOTTOM AND CAMS ARE SYNONYMOUS

Box, barrel, side or indexing . . . all types . . . hardened and ground if required . . . Rowbottom makes them all . . . as well as machines for producing them. Just tell us what you need.

THE ROWBOTTOM MACHINE CO., WATERBURY, CONN.

For more data circle 488 on Postpaid Card

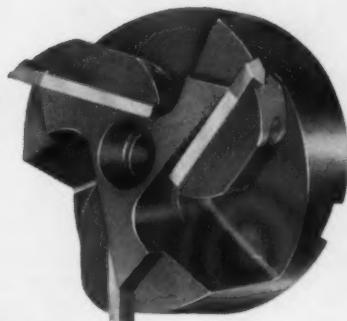
NEW

- OFFERS . . .
- ★ CARBIDE INSERTS
 - ★ SHEAR CUT ACTION
 - ★ MORE USEABLE CARBIDE
 - ★ IT'S ECONOMICAL TO BUY AND MAINTAIN
 - ★ QUICK SETTING GAGE INCLUDED

Manchester --- MILLING --- CUTTERS

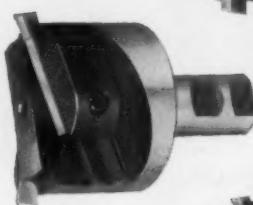
M-50 →

5" dia. cutter
(with 1-½" dia.
pilot hole)
3, ¾" wide
carbide inserts



← M-35

3-½" dia. cutter,
1-¼" dia. shank,
2 carbide inserts
¼" or ¾" wide



M-25 ↑

2-½" dia. cutter,
¾" or 1" dia. shank,
2 carbide inserts
¼" or ¾" wide



PORTAGE Double-Quick, Inc.

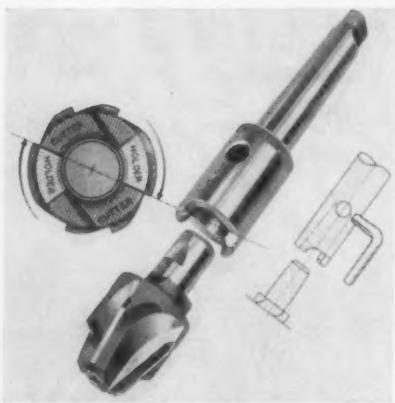
1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle 489 on Postpaid Card

March, 1958

modern machine shop 249

new shop equipment . . .



Sketch shows how on-center lugs are always in full contact to transmit driving power from the spindle with rigidity and accuracy

is provided for easy removal of tools from the holder.

The tools and holders are made to order for special tooling. Five sizes of holders will accommodate cutters from $\frac{3}{4}$ through $3\frac{1}{8}$ inch o.d. They are available in any grade of high speed tool steel and can be carbide tipped. For more data circle 97 on Postpaid Card

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ADJUSTABLE HOLE CUTTER

Insley of Canada, Ltd., 2052 S. Catherine St., West, Montreal 25, P.Q., Canada, has announced the availability of Paralex Adjustable Hole Cutters, which have been designed for use in drilling machines or lathes. According to the manufacturer, absolute rigidity is guaranteed and essential parts are especially toughened. They have a micro-adjustment to 1/200th

the
ARC-TWIN Cuts Two Perfect Notches
in One Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing!

Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from $\frac{1}{2}$ " to $2\frac{1}{8}$ " O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.

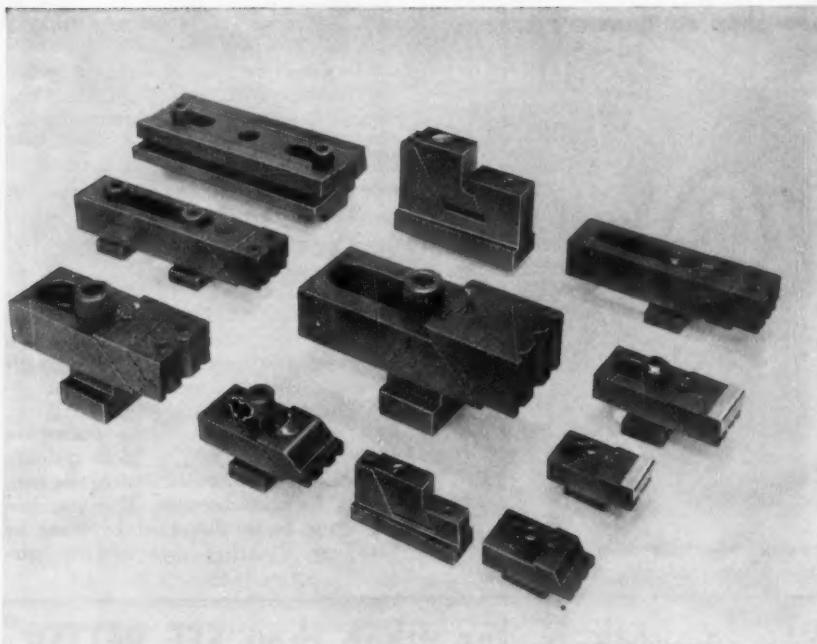


1823 North 32nd Avenue
Melrose Park, Illinois

VOGEL

TOOL AND DIE CORPORATION

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Where you can get ...

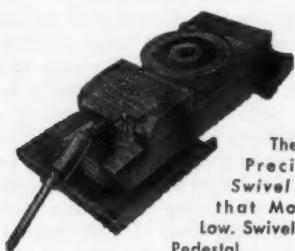
DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of $2\frac{1}{2}$ tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled. Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems—no interference with measuring tool readings.

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The only
Precision
Swivel Vise
that Mounts
Low. Swivels. No
Pedestal.

WHEEL DRESSERS

J & S
TOOL CO., INC.

JAW CLAMPS • PRECISION VISES • DOWN HOLDING DEVICES

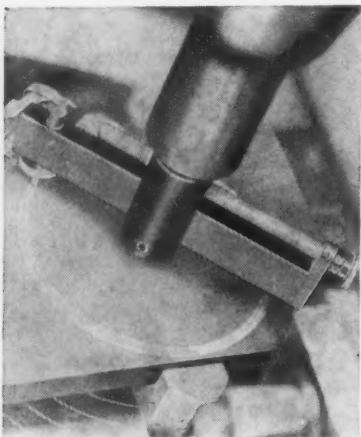
J & S TOOL CO., INC.

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CLAMP CUT

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

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Paralex Adjustable Hole Cutter in use

inch and cover all diameters from 1 inch to 12½ inches.

They may be used in aircraft, radio, shipbuilding, mechanical, constructional and various other industries.

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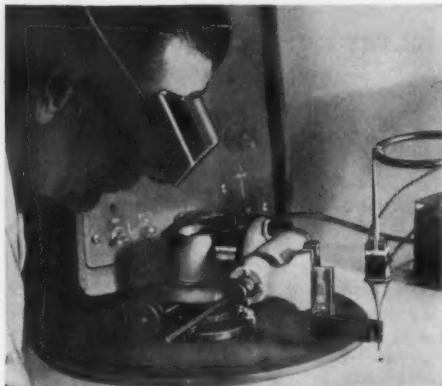
★ modern machine shop ★

VISE LOCKS QUICKLY AND POSITIVELY

The Palmgren No. 32 Quick Lock Vise has been announced by Chicago Tool and Engineering Co., 8399 South Chicago Ave., Chicago 17, Illinois.

Designed for production drilling, tapping and assembly, the Palmgren No. 32 Quick Lock Vise locks quickly and positively with the Palmgren cam and Y lock mechanism. The vise has no screw to be damaged by wear or breakage. Bearing and locking sur-

People work better when they SEE BETTER®



Lockheed Aircraft Corp., Missile Systems Div., uses MAGNI-FOCUSER to watch Ultrasonic Drill making holes five thousands of an inch, the size of human hair.

For increased production, greater accuracy, fewer accidents and errors, use the MAGNI-FOCUSER—the new 3-D binocular magnifier with matched prismatic lenses. It provides needle-sharp vision — greatly magnified and in third dimension.

Scores of industrial jobs are being aided by the MAGNI-FOCUSER. It reduces eye strain and avoids squinting; leaves both hands free to work. It's light weight; can be worn with or without eye glasses; normal vision resumed simply by raising the head.

Speed your production by ordering now on 10-day trial basis without obligation. Only \$10.50. Immediate delivery. Or write for illustrated folder.

the 3-D Magnifier that speeds production and leaves both hands free to work

MAGNI-FOCUSER
EDROY PRODUCTS CO., Dept. P, 480 Lexington Ave., New York 17, N. Y.

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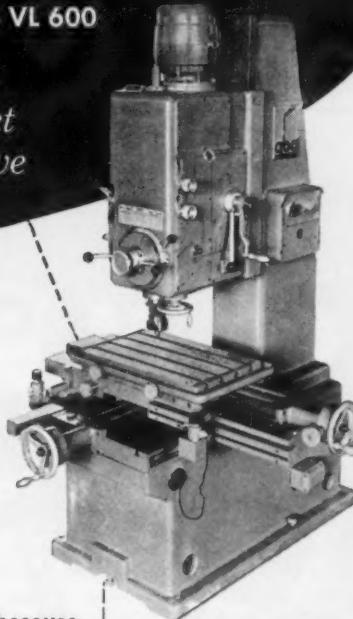
direct reading of 50 millionths!



high precision
OPTICAL JIG BORER
Type VL 600

*With capacity and
features you'd expect
only in very expensive
machines*

- No gauge blocks, measuring rods or lead screw dials needed.
- For heavy duty as well as the finest precision boring and facing operations.
- Eliminates unnecessary time and expense in layout and measuring work.
- Also available with electronic automatic positioning.
- \$15,980.00 f.o.b. pier, N.Y. or L.A., fully equipped. Includes full insurance f.a.s. your plant, and set-up by factory trained mechanic.
- Smaller and larger capacity machines also available.



PARTIAL SPECIFICATIONS

Working surface	27 $\frac{3}{4}$ " x 16"
Table travel	26" x 17"
Maximum distance from table to bot- tom of spindle	24 $\frac{1}{2}$ "
Quill travel (automatic up and down feed)	8%"
Approx. weight	5,600 lbs.

You can depend on its performance because ABA of Western Germany has designed and built jig borers for 25 years. One of the world's most respected names in machine tools, ABA also makes optical layout and measuring tables of various sizes to your requirements. Measuring scales manufactured by Leitz. In service in top plants throughout the U.S. and Canada. Full year guarantee.

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Importers of Jig Borers, Radial Drilling Machines, Grinding Machines, Optical Inspection Equipment, Milling Machines, Planers, Shapers, Rotary Tables, Lathes

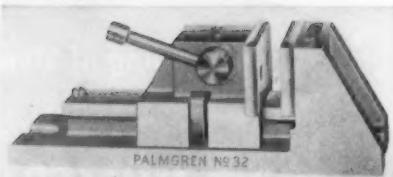
10-35 44th DRIVE, LONG ISLAND CITY 1, N. Y., TELEPHONE: STILLWELL 4-1546

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faces are hardened for long service.

Ideal for all operations requiring fast adjustment for various size pieces, only a flick of the locking lever is necessary to release the quick lock, and the movable jaw slides easily to any position. This vise weighs only 2½ pounds with 2½ inch jaw width, 1½ inch jaw opening and 1¼ inch



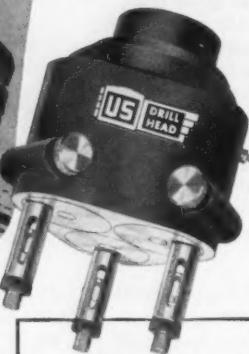
Palmgren No. 32 Quick Lock Vise

jaw depth. It can be carried easily in a tool box by service and maintenance men. The No. 32 Quick Lock Vise is only 2-5/16 inches high and 7 inches long, with two bolt slots for quick attachment to machine or bench. Both sides, as well as top and bottom, are machined. This provides square surface for setting in any position.

For more data circle 99 on Postpaid Card

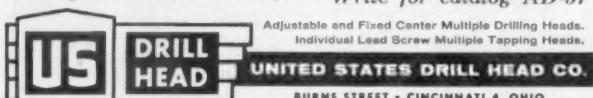


**LOTS OF
HOLES . . .
FAST?**



Standard Adjustable 3-spindle head, all spindles adjustable. Five styles—2 to 4 spindles, up to 1½" drill sizes, up to 15" bolt circles.

For 2, 3 or 4 spindle drilling you can do it better, faster, at lower cost with U. S. Standard Adjustable Heads. More reserve stamina built in . . . antifriction bearings . . . high alloy steel spindles and shafts . . . heat treated and shaved gears . . . more than ample spindle bearing . . . parts run in oil (oil-mist for speeds around 4000 rpm). Write for catalog AD-57



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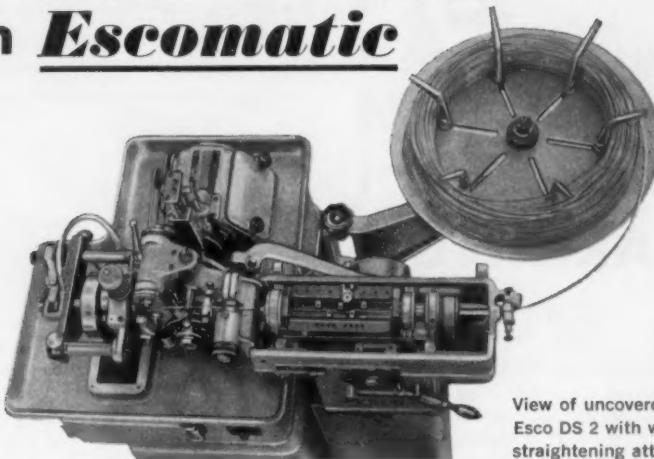
CHAIN SLAT CONVEYOR APRON

An all steel, chain slat, conveyor apron, recently introduced by Robert A. Main and Sons, Inc., 28 Pascack Rd., Paramus, N. J., is shown in the accompanying illustration. Steel slats are shown mounted on forged steel, heat

Adjustable and Fixed Center Multiple Drilling Heads.
Individual Lead Screw Multiple Tapping Heads.

BURNS STREET • CINCINNATI 4, OHIO

Produce Small Parts Faster At Lower Cost With An ***Escomatic***



View of uncovered
Esco DS 2 with wire
straightening attachment.

Feed from Coil or Bar Stock

TYPICAL PARTS MADE BY AN ESCOMATIC	
12 parts/min.	Commercial Bronze
6 parts/min.	Pinion Stock
63 parts/min.	Nickel-Silver

1.100" .385" .043"

.125" .047" .022"

Up to 100 precision parts per minute are possible on the Esco DS 2, a Swiss form-turning and cut-off machine. Stock, fed from coils or bars of any length, is machined by two revolving cutting tools mounted in a cam controlled tool head. Resulting parts are clean, accurate and entirely burr-free—and are delivered separate from the chips. Coil feed provides efficiency up to 95%, eliminates bar ends, speeds production.

- Capacity Up to 5/32" dia. x 3 3/4" length
- Accuracy As close as $\pm .00025"$
- Finish As fine as 8 micro-inches

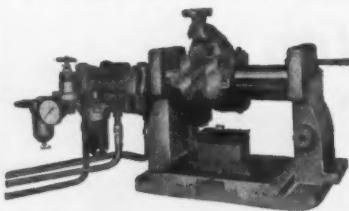
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COSA

—nationwide sales and service of precision machine tools
—from bench lathes to boring mills.

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.
In Canada—Cosa Corporation of Canada, Ltd., 1160 Lakeshore Road, Long Branch, Toronto 14, Ont.

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PRECISION

MARKING

at low cost

The ACROMARK Model 9A Marking Machine provides a fast means for marking steel, other metals and materials by the "line contact method". It essentially eliminates poor markings or inaccuracies. Your shop air line provides the power (75 p.s.i. and up) and the operation is quiet with no stamping or jarring problems.

ACROMARK Model 9A Machines are standard with strokes from 6" to 14". Clearance under head is from 6" to 7 3/4" front, 3 1/2" to 5" rear. Back is open for extending parts or high production line adaptation. Hand and Motor models also standard. Famous for wide adaptability and long life.

"Inventors and manufacturers of more than 300 kinds of marking machines — largely standardized. Specify ACROMARK to get the right machine for the job."

Write now for Catalog No. 9 and send sample or sketch of parts to be marked for engineers' recommendation—with out obligation. We furnish dies, machine and everything.

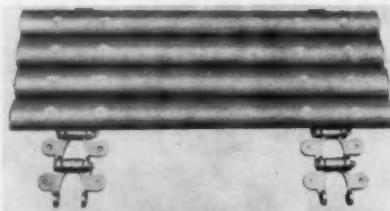
the
ACROMARK
Company

9 Morell St., Elizabeth 4, N. J.

"THE ORIGINAL MARKING SPECIALISTS"

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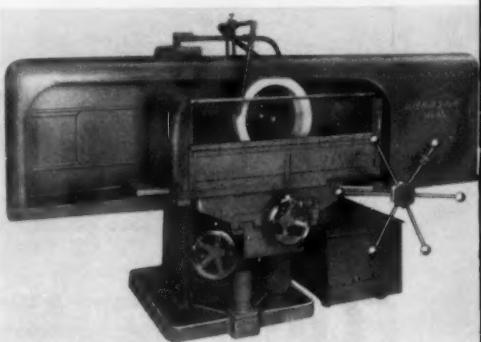
R. A. Main Chain Slat Conveyor Apron

treated, chain links, measuring eight slats per foot. The chain is suitable for long, hard wear and shock resistant duty because it is heat treated. For more data circle 100 on Postpaid Card

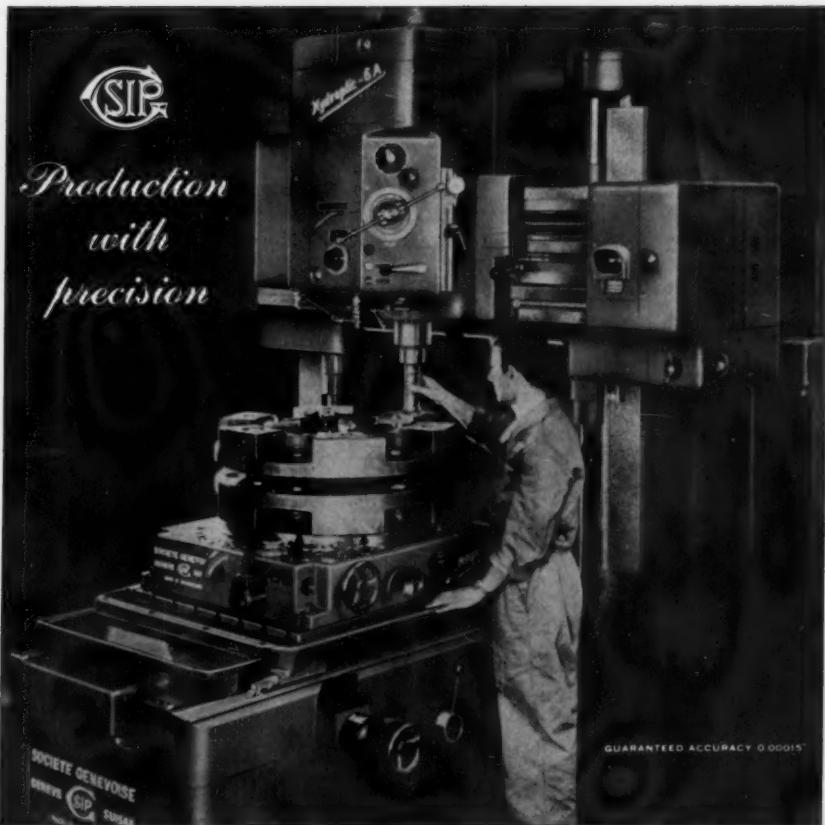
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POWER TABLE FEED AVAILABLE ON FACE GRINDER

Abrasive Machine Tool Co., East Providence, R. I., is now offering its 18 inch face grinder which is available with power feed to the table. A hydraulic power system with a 2 h.p., 1,200 r.p.m. motor, the unit provides the equivalent of a 50 pound push at



Abrasive Face Grinder has power table feed



GUARANTEED ACCURACY 0.0001"

...attained with the New
SIP HYDROPTIC 6A Jig Boring and Milling Machine

Due to unprecedeted cutting ability . . . increased range and capacity . . . simplification of controls . . . and ease of operation, the HYDROPTIC 6A is unmatched in performance.

Up to 30% increase in productivity has been realized with the AUTOMATIC COORDINATE REPEATING DEVICE DIR (optional equipment) which repeats successively the initial settings made during the machining of the first workpiece.



*As with all SIP HYDROPTICS, accuracy is based on SIP High Precision STANDARD SCALES.
For complete information, send for Catalog No. 1149.*

AMERICAN SIP CORPORATION • 100 EAST 42 ST., NEW YORK 17, N.Y.
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the handwheel, which amounts to 600 pounds at the table. Maximum cutting speed is 25 feet per minute and the return is 42 feet per minute. For safety, the power unit is interlocked with the table handwheel. One cannot be used without disengaging the other.

The Abrasive 18 Inch Face Grinder is claimed to remove metal on flat sur-

faces faster than planing or milling and to give a grinding finish. It has a 15 h.p., 900 r.p.m. heavy duty motorized spindle. Box type way construction provides maximum rigidity for accuracy in grinding any flat or square surface, as well as providing large bearing surfaces.

This Abrasive Face Grinder is currently being used for grinding automobile dies, plastic moulding dies, moulded insulated fire brick, ceramic insulators and all types of forging dies.

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101 on Postpaid Card

★ m m s ★

SPLINING HEAD

Earle G. Boyer, P. O. Box 4909, Philadelphia 19, Pa., has introduced a Universal Cost Cutter.

This is said to be a unique, extremely useful cost cutting tool for milling multiple splines or flutes (straight or spiral) on an ordinary drill press or engine lathe on a short run or

ARROW TOOL & REAMER CO. • Established 1916

ARROW TOOL & REAMER CO.
711 Stephenson Highway
P.O. Box 338 • Troy, Michigan

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Boyer Universal Cost Cutter Splining Head



ARBO-2
automatic indexing
turret type multi-
spindle drill head

JEMCO'S ARBO-2 fits any
single spindle vertical drill press

all operations completed with one chucking — no reversing of drill spindle necessary for tapping — speeds changed quickly — reduces machining time — tapping capacity 1/8 to 9/16; drilling capacity 0 to 19/32

SEE US AT THE TOOL SHOW—
BOOTH 2961

J Jersey manufacturing co.
401-C LIVINGSTON ST. • ELIZABETH, N. J.
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DRILLS from 2 to 7 holes

TAPS from 2 to 7 different sizes in one chucking

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There's a Model available to solve all your particular problems economically.

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The ONLY Live Center On Which Points May Be Interchanged to $\pm .0001$

Points Must Be
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To Achieve This
Degree Of
Accuracy.



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Empire Live Centers

Quality engineered for use on lathes, grinders, and milling machines . . . Empire Live Centers are versatile, accurate, heavy duty. Tapered seats give consistent precision alignment . . . assure accuracy of .0001. Positive seal eliminates dirt, grit, cutting oils. Combination bearings absorb both radial and thrust loads.



Manufactured in all tapers:
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Special shanks and points
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Empire Toolmaker's Set
available in handrubbed
American Walnut case.

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March, 1958

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a production basis. This tool will also mill square, hexagon or octagon, and can be operated efficiently by unskilled labor.

Furthermore, with an offset cutter holder it will flute taps, reamers, spot-facers, counterbores and special cutting tools. It will provide close toler-

ances well within commercial standards, will successfully operate either forward or reverse, longitudinal or vertical, or at any angle or degree between same.

Splines or grooves can be milled either straight or spiral, in either direction, at a maximum or low pitch.

The Universal Cost Cutter is available in a taper shank model for use on a drill press, or in the hollow spindle for long workpieces. Sizes are

available for splining capacities from $\frac{5}{8}$ to 5 inch diameters.

For more data circle 102 on Postpaid Card

FAST DELIVERY on NOPAK shelf-stock AIR CYLINDERS!

Your choice of —

- 6 Mounting Styles
- 8 Bore Sizes
- 9 Stroke Lengths

When you specify NOPAK "Shelf-Stock" Air Cylinders you save money 3 ways:

1. You eliminate waiting for "specials".
2. You reduce engineering costs.
3. You get top quality NOPAK Air Cylinders at the lowest possible prices.

NOPAK "Shelf-Stock" Air Cylinders are available in a wide range of bore sizes and stroke lengths from $1\frac{1}{2}'' \times 1''$ to $8'' \times 15''$. No other manufacturer offers such a wide range of selection in Brass Tubing, Precision Machined, Cushioned Air Cylinders at comparable prices.

NOW! 5"BORE"

with no price change — extra cylinder power at no extra cost. Compare quality and prices, and you'll specify NOPAK. Write for Current Listings and Catalog 101.

GALLAND-HENNING NOPAK DIVISION • 2738 S. 31st St., Milwaukee 46, Wis.

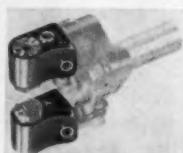
NO~~P~~A~~K~~ VALVES and CYLINDERS

A-6-701-19

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MODEL "E"
with Clevis and
Mounting Bracket



R and L Knurling
Tool Attachment

Amcor Roller Stock Pushers



FOR POSITIVE STOCK ALIGNMENT

5 IMPORTANT ADVANTAGES

- LOW COST — costs only a fraction of hand-made pushers
- SIMPLICITY OF INSTALLATION — requires milling of one slot and drilling of one hole
- COMPACT — engineered and manufactured for minimum space requirements
- ANTI-FRICTION — hardened roller on brass shaft requires minimum effort to insert and feed stock
- MINIMUM DIE MAINTENANCE — no retightening necessary when die is sharpened . . . increases pilot life

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Distributor inquiries invited

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T. H. LEWTHWAITE MACHINE CO.

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Send for new catalog sheets on our complete line, which include charts and instructions on figuring clearances.

Using the right tools for the specific work will enable you to get the full benefit of the exceptional durability of

Lewthwaite

Punches & Dies

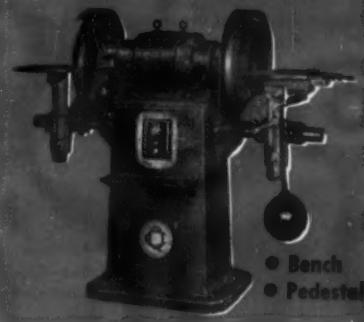


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March, 1958

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QUEEN CITY HEAVY DUTY GRINDERS DISC GRINDERS AND BUFFERS



QUEEN CITY Heavy Duty Disc Grinders and Buffers save you money when you buy and during every hour of use. Ruggedly designed, they feature special heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

Choose from the complete range of QUEEN CITY Grinders and Buffers . . . floor and bench types . . . in sizes from $\frac{1}{2}$ to 10 H.P.

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"High Quality—Low Cost—For Over 50 Years"

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the addition of this accessory, the turning tool can produce either straight or diamond pattern knurling with knurls being adjusted to any desired angle. Our hex wrench makes all of the adjustments. A set screw locks the knurls securely. Knurls may be changed without removing tool from turret.

TICKLISH FINISHING JOB?

do it better with a Paramount Felt Bob

If you have a tough polishing, buffing, lapping or de-burring finishing problem where tolerances must be held close, solve it by putting a Paramount Bob on the job. Seven custom shapes, 42 sizes, four degrees of hardness from soft to rock hard — there's a Paramount Bob ideal for every close-quarters precision finishing job. For example:



MICRO-FINISHING

Paramount Felt Bobs make ultra-fine finishing of surfaces quick, easy and economical.



DIE AND MOLD MAKING

Thousands of die and mold makers depend on Paramount Bobs to perform precision finishing and buffing operations. Ideal for removing burrs without destroying close tolerances.

NEW BOB ASSORTMENT KITS

K-1 Assortment includes 24 mandrel mounted bobs, 36 small wheels, touch-up pads — 66 pieces all together — packaged in one convenient bench top box. (K-2 Assortment also includes four sticks assorted polishing compounds.)

These handy assortments provide bobs of just the size, shape and hardness you want — and at \$10.95 (K-1) and \$12.95 (K-2) they are far below the cost of buying bobs separately.

See your jobber or write for literature

BACON FELT CO. **JOBBER INQUIRIES
INVITED**
457 West Water St., Taunton, Mass.

For more data circle 506 on Postpaid Card

The manufacturer states that construction is heat treated alloy steel to insure maximum strength. All holes are ground for accurate alignment. The unit is said to operate as a rigid and durable accessory when used with the R and L Turning Tool.

The R and L Turning Tool is a versatile unit which replaces an assortment of 14 tools. It functions as a roller box tool, a centering and facing tool, knee tool, pointing tool, back rest, floating drill holder and balancing turning tool, changing from right to left hand position in ten seconds. The addition of the knurling attachment lends even greater versatility. For more data circle 103 on Postpaid Card



★ m m s ★

MAGNETIC CHUCK

A fine-grid magnetic chuck has been announced by Hanchett Magna-Lock Corp., 572 Maple St., Big Rapids, Mich. It has precision meshed magnetic poles, which are claimed to be 37 per cent closer together than in other chucks of this type. The resulting powerful magnetic pull holds

**PACE TAPER ROLLER BEARING
LIVE CENTERS**

ACCURACY
 $\pm .0001"$ TIR

RIGIDITY

Preloaded with two Precision Matched Timken or Bower Taper Roller Bearings for . . . GRINDING • PRECISION TURNING HEAVY-DUTY OPERATIONS

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JIG BORING
SPOT WELDING
CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 55-C

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Popular package
8-oz. can fitted
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holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few min-
utes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.

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... just connect to gas supply!

Outstanding service since 1911! Each unit, with the famous "BUZZER" Venturi, delivers the hottest, quickest heat attainable without a blower. Full range control of heat and turn-down. Standards or specials available for manufactured, natural or liquefied gas applications.

Write for New "BUZZER" Catalog.

CHARLES A. HONES, INC.

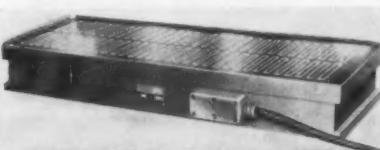
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Bench Type Oven Furnaces

Atmospheric Pot Furnaces

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new shop equipment . . .



Magna-Lock Fine Grid Magnetic Chuck

even small parts firmly in place while being machined. The magnetic poles are $\frac{3}{8}$ inch steel separated by $\frac{1}{8}$ inch non-magnetic separators of CRP242 hard epoxy resin or Magna-Lock special soft metal. Epoxy resin separators are easy to grind in and are particularly suited for electrolytic grinding operations, because they resist electrolytic action. Magna-Lock special soft metal is available as an alternate material for all Magna-Lock Fine-Grid Chucks.

Magna-Lock Fine-Grid Chucks consume little wattage. They are available in all sizes and can be installed in tandem mounting or end to end to make up larger table surfaces.

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★ m m s ★



FISKE'S DIE CASTING COMPOUNDS

These compounds are made in several grades to meet various application requirements such as brushing, swabbing, or spraying. Permit greater production because of more pieces between applications. Improves surface finish . . . prevents sticking and soldering . . . minimizes carbon formation . . . reduces fumes and smoke. Bulletins describing Fiske's Die Casting Compound and other specialty lubricants and coolants sent on request.



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Plants: Newark 5, N. J. and Toledo 5, Ohio

For more data circle 511 on Postpaid Card

CARBIDE TWIST DRILLS

A complete line of carbide tipped and solid carbide twist drills has been designed by National Twist Drill and Tool Co., Rochester, Mich., for drilling various types of non-metallic and non-ferrous materials. These are now available from stock in all the most popular styles and sizes.

SAVE

AIR COSTS & MAINTENANCE



Model A

with Air-O-Check, the Leak-Proof Air Gun. Hundreds of thousands in use in factories, machine shops and foundries . . . wherever air is blown.



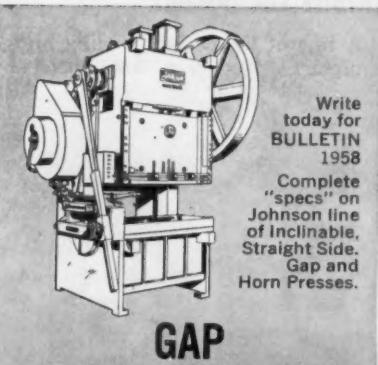
Model FA

Expert design of internal fulcrumed lever insures leakproof, dependable, care-free service.

Write today for literature and prices.

AIR-WAY PUMP & EQUIPMENT CO.
1046 N. Kilbourn Ave., Chicago 51, Ill.

For more data circle 512 on Postpaid Card



GAP

Write today for BULLETIN 1958

Complete "specs" on Johnson line of Inclinable, Straight Side, Gap and Horn Presses.

Johnson

POWER PRESSES

JOHNSON MACHINE & PRESS CORP.
620 W. INDIANA AVE., ELKHART, INDIANA

For more data circle 513 on Postpaid Card
March, 1958

LOW COST

priced so low you can afford several for your shop

SUPERIOR PERFORMANCE

Gives You More Features, Does More Work Than Any Other Comparable Machine



The NEW BACKUS ABRASIVE WHEEL CUT OFF SAW For Ferrous Metals

HERE'S WHAT THIS SENSATIONAL MACHINE CAN DO IN YOUR SHOP:

- Cuts 1½" bars, 2" tubing, 1½" pipe, 2" x 2" x ¼" angles
- Protects for overload and low voltage
- Has Quick action vise
- PLUS special engineered leverage for maximum sensitive "feel"
- Eliminates costly breakdowns
- Prevents high maintenance

Converts Easily For Cutting of Non-Ferrous Materials Also!

This abrasive saw is already machined to accommodate the Backus Multi-Purpose Saw Unit. With this conversion unit, the saw may be used for cutting both ferrous and non-ferrous metals!

Also Available . . .
Backus Non-Ferrous Cut Off Saw
For Aluminum and Aluminum Extrusions
Plastics, Brass, Slats and Roll-Up Awnings

BACKUS

machine works SINCE 1914

ROUTE 17 CARLSTADT, NEW JERSEY

For more data circle 514 on Postpaid Card
modern machine shop 265

"DO IT YOURSELF" Saves Hours, Cuts Costs



**HEAT TREAT SMALL PARTS,
TOOLS, DIES, ETC. IN YOUR OWN
SHOP WITH A VERSATILE, HIGHLY
EFFICIENT TEMCO ELECTRIC FURNACE.** Why tie up your big equipment on small heat treat jobs below its capacity, or why "farm out" heat treating of parts, tools, dies? Put a TEMCO bench-type electric furnace in your shop and see how it pays for itself over and over again—in time-savings, cost savings, and production conveniences. Shown above is Type 1700 furnace with the Control Cabinet Assembly featuring the fully-automatic AMPLITROL controller in this convenient mounting.

Temco Furnaces are economical to own and operate . . . easy to hook up . . . easy to use. Eighteen models with chamber sizes from 4" x 3 3/4" x 4 1/4" to 10" x 9 1/2" x 22". \$65 to \$983.25 complete with controls. Write for new TEMCO Catalog and name of nearest dealer.



ELECTRIC FURNACES

Thermo Electric Manufacturing Co.
488 Huff St., Dubuque, Iowa

For more data circle 515 on Postpaid Card

new shop equipment . . .



(Top) National Solid Carbide Twist Drill;
(bottom) Carbide Tipped Twist Drill

Carbide drills also perform well on many cast iron applications and on some steels where chip forming conditions are satisfactory.

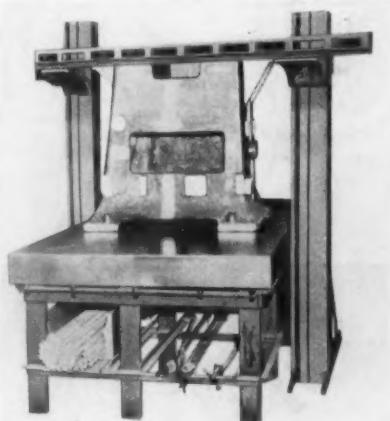
In brittle and abrasive materials these carbide drills will permit high cutting speeds and, because of the high wear resistance of carbides, will result in improved tool life.

For more data circle 105 on Postpaid Card

★ modern machine shop ★

LIGHTWEIGHT TOOLING BRIDGE EQUIPMENT

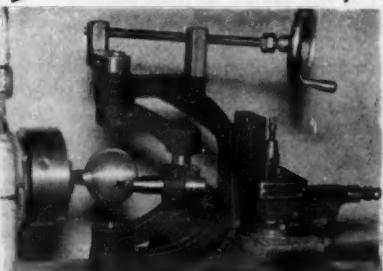
A line of lightweight tooling bridge equipment has been announced by



Challenge Tooling Bridge Equipment

New

RADITURN ✓



CUTS ANY RADIUS

Convex, Concave or Ball

Patented

The accurate short cut for turning any radius. Adaptable to most any lathe.

Contact your tool supplier or write for details.

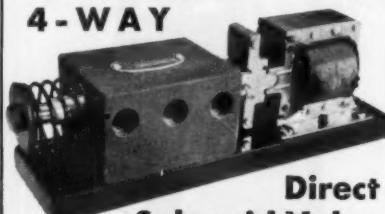
RETCO MFG. & SALES

1458 E. CLINTON

FRANKFORT, IND.

For more data circle 516 on Postpaid Card

BACHMAN 4-WAY



Direct Solenoid Valve for Double-Acting Cylinders

Solenoid closes with force of 14 lbs., assuring positive action for air and fluids to 200 psi. Resilient design gives quiet performance for millions of cycles. Inrush, 4 a., holding 25 w. Illustrated $\frac{1}{4}$ " valve is 8" long, weighs 2 lbs. Thousands in use. Try one in your plant for 30 days without obligation. Complete line of $\frac{1}{4}$ " and $\frac{1}{2}$ " models, \$12 to \$20. Write for literature.

John D. Bachman & Company

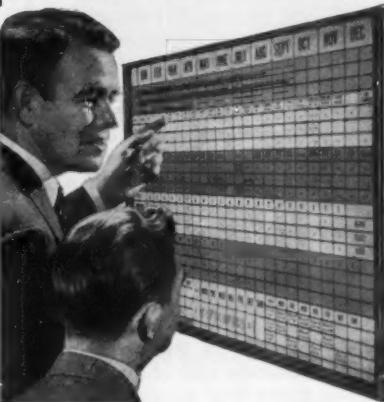
1849 SPARGER LANE

BRISTOL, TENN.

For more data circle 517 on Postpaid Card

March, 1958

You Get Things Done With Boardmaster Visual Control



★ Gives Graphic Picture of Your Operations — Spotlighted by Color

★ Facts at a glance—Saves Time, Saves Money, Prevents Errors

★ Simple to operate — Type or Write on Cards, Snap in Grooves

★ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.

★ Made of Metal. Compact and Attractive. Over 250,000 in use.

Complete price \$49.50 including cards

FREE

24-PAGE BOOKLET NO. MS-50
Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.

For more data circle 518 on Postpaid Card

modern machine shop 267

new shop equipment . . .

The Challenge Machinery Co., SE 111, Grand Haven, Michigan.

The equipment provides the engineer with a new tool for the accurate three dimensional measurement of irregularly shaped objects, such as models, prototypes, tools, dies or finished stampings or castings.

A typical setup consists of a semi-steel base unit and accurate lightweight magnesium vertical and horizontal units, such as shown in the accompanying illustration.

These vertical and horizontal units can be easily moved in any desired position. Base plates, uprights, platform angles, parallels and sliding angles of various types are available from the manufacturer.

For more data circle 106 on Postpaid Card

INFRARED OVEN SECTIONS ACCOMMODATE THREE LINEAR HEAT SOURCES

A series of infrared oven sections, accommodating all three proven linear heat sources, was announced recently by The Fostoria Pressed Steel Corp., Fostoria, Ohio. Designated as the 50-000, 52-000 Series, the sections can be equipped with metal rods, quartz lamps or quartz tubes for industrial finishing operations.

Two types of reflectors are available with the 51-000, 52-000 equipment; specular gold and aluminized steel. To gain maximum efficiency from any source used, the reflectors have been optically designed to distribute an even pattern of radiant heat over the entire product.

There are two basic sections. Both are identical in length, but are manufactured in two different widths. The

HEATS FAST SAVES TIME

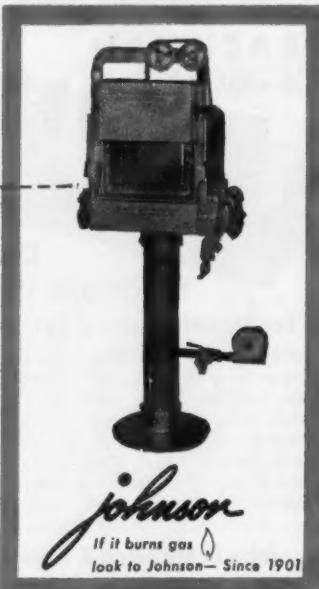
johnson

NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory \$358.00
Write today for free Johnson Catalog

JOHNSON GAS APPLIANCE COMPANY
571 E Avenue NW, Cedar Rapids, Iowa

For more data circle 519 on Postpaid Card



GANT

RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 520 on Postpaid Card

HYDRAULIC LIFT TABLES



Pat. Pending

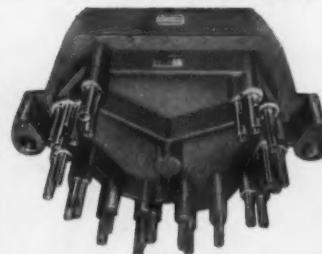
Lexco portable adjustable height—hand or foot operated—saves you MONEY—TIME—ENERGY. For lifting and transporting heavy castings, dies, machine accessories and parts to machines and presses. Capacities to 2,000 lbs. Special sizes available—also AIR LIFTS and DIE HANDLERS.

Write for free bulletins.

LEXCO ENGINEERING
& MFG. CORP.
20 W. Chestnut St. • Souderton, Pa.

For more data circle 521 on Postpaid Card

March, 1958



This **THRIFTMASTER** Fixed Center **DRILLHEAD**

**does 27 jobs
in 1 fast operation!**

Get maximum production—use Thriftmaster designed and built Fixed Center Drillheads . . .

- Full ball bearing construction
- Fully hardened chrome-moly steel gears, spindles and drives
- All sizes, any number of spindles
- All types, including angular, rotating and lead screw
- For drilling, tapping, reaming, boring and milling
- Guaranteed performance backed by over 25 years of engineering and production experience

Also Full Ball Bearing Universal Joint, Single and Double Eccentric Adjustable Drillheads and Dorman Tappers.

Write, wire or phone for complete information today.



THRIFTMASTER
Products Corporation.

A SUBSIDIARY OF
THOMSON INDUSTRIES, INC.

1034 N. PLUM STREET • LANCASTER, PENNSYLVANIA
For more data circle 522 on Postpaid Card

modern machine shop 269

new shop equipment . . .

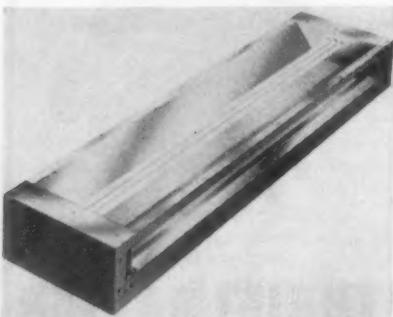


Illustration of Fostoria Infrared Oven Section

5½ inch wide section has been designed for use with one or two heat sources, while the 11 inch model is prepared to use one, two or three sources. Both of these models are avail-

able in a range of various lengths.

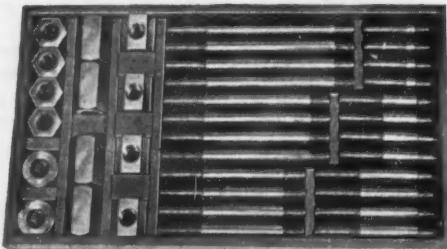
The new socket design featured in the 51-000, 52-000 infrared sections makes it possible to load or change source units from the front of the oven. Terminal wires can be inserted into the sockets and securely fastened from the front. The socket will accommodate one, two or three heat sources —thereby allowing the user to start operations with one source and increase the capabilities later on.

Other features of the Fostoria sections include: (1) new bolt type construction that allows the rapid change in oven setup to meet varying production requirements; (2) new electrical controls for exact selection of finishing temperature; and (3) new open-end design, which allows the addition of more sections when production requirements call for greater finishing capacity.

For more data circle 107 on Postpaid Card

REID Tool Room NEEDS

HANDY SET-UP STUD SETS



Available in 12 different sets in a wide range of sizes. Each set contains 24 studs, 4 each of T-Nuts, Coupling Nuts, Hexagon Nuts, and Washers. Each item also obtainable separately.

FREE: 74 page catalog listing scores of needed items for tool rooms. Address

REID TOOL SUPPLY COMPANY

MUSKEGON HEIGHTS, MICHIGAN

For more data circle 523 on Postpaid Card

"SEALFLEX" TUBING



**Leakproof—
Stays in place
For Coolants, Cutting
Oils, Solvents**

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.

Lyndonville, Vermont

For more data circle 524 on Postpaid Card

G E A R S

In Stock—Immediate
Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

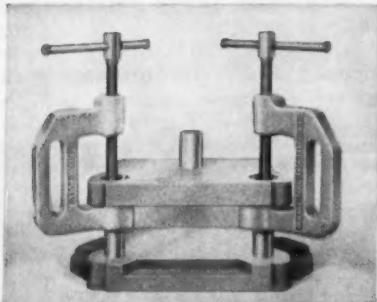
Send for Complete Catalog No. 20

CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 525 on Postpaid Card

**economically priced
press room equipment**



DURANT Die Set Pullers

Easily removes punch holder from die shoe by a straight upward pull, yet protects the die set. 3 Models fit all sizes of die sets. Priced from \$18.00 per pair.

WRITE FOR NEW FREE CATALOG

**DURANT TOOL SUPPLY CO.
PROVIDENCE 3, RHODE ISLAND**

For more data circle 526 on Postpaid Card

March, 1958



NEW ADJUSTABLE DRILL JIG

**eliminates layout;
cuts drilling time**

Used for drilling holes through round stock and hex stock from $\frac{1}{4}$ " to 2" and cap screws from $\frac{1}{4}$ " to $1\frac{1}{4}$ ", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operations that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for $\frac{1}{4}$ " to $21/32$ " diameter, one for $21/32$ " to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. Jig highly successful in permitting use of inexperienced drill operators. For circular write to Mathewson Machine Works, 40 Hancock Street, Quincy, Massachusetts.

For more data circle 527 on Postpaid Card

new shop equipment . . .

WORKHOLDING DEVICE FOR DRILL PRESS

Cincinnati Tool Co., 1947 Waverly Ave., Cincinnati 12, Ohio, has intro-

REICH—THE ONLY 3-WAY PRECISION TEST INDICATOR

Accurate and repeated reading in either direction. No mirror needed to read both sides or top. Non rust, non magnetic movement. .014" reading.

Price \$9.00

Write for folder



J. R. REICH MANUFACTURING CO.
201 E. Stroop Road Dayton 29, Ohio
For more data circle 528 on Postpaid Card

END MILLS SHARPENED

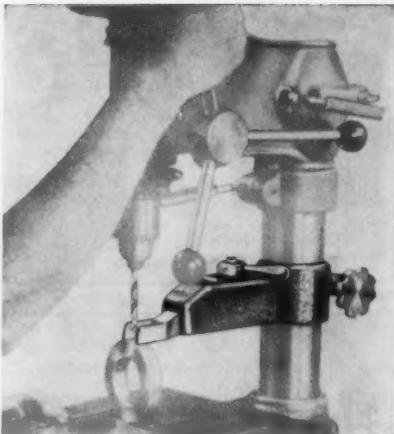
ENDS AND SIDES
9/16" to 3/4" . . . 80¢ an end
13/16" to 1" . . . \$1.00 an end
POSTAGE PREPAID ON ALL ORDERS

Satisfaction Guaranteed—
One week delivery

MARCI END MILL GRINDING CO.
End Mill Sharpening—Our Only Business
P. O. Box 176E Flushing 52, N. Y.

For more data circle 529 on Postpaid Card

UP TO 1/2"
60¢
AN END

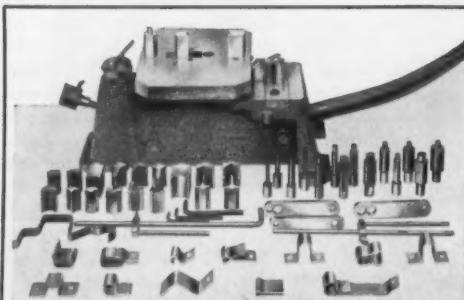


Sta-Put Workholding Device in use

duced a workholding device, called the Sta-Put, which has been designed for drill press operators. The split collar of the Sta-Put is easily attached to a drill press column and can be quickly adjusted to hold almost any shaped piece securely in desired alignment with the drill. It is available with wheel or lever handle.

It is claimed that Sta-Put eliminates slipping, reduces drill breakage, spoilage of expensive material and the danger of broken fingers and skinned knuckles.

For more data circle 108 on Postpaid Card



For more data circle 530 on Postpaid Card

Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape. Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

AIR OR HAND MODELS FOR UP TO
1/4" to 4" MATERIAL

Write for brochure which illustrates
and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 531 on Postpaid Card

The
"MASTER COMPAR"

INDICATING MICROMETER COMPARATOR

has the *VISIBILE* feel

No Arguments as to
correctness of reading
due to "feel".

To attain permanent accuracy
of these close limits, highest
precision workmanship and
exclusive design of mechanism
are of major importance
and ONLY found in
"MASTER COMPAR".

Ask for Illustrated Circular — Code G10P Sold thru Tool Supply Houses
GEORGE SCHERR CO., INC. Ask for Demonstration

Use it as Comparator,
Master Micrometer,
Go & No Go Gage.

1" Range reading in
1/10,000"

A RIGHT HAND TOOL

Release button for movable Anvils or RIGHT Hand side
enables you to hold tool the conventional way.
NEW — Resetting to Zero in 5 seconds
Quick adjustable tolerance heads. Heavy TUNGSTEN
CARBIDE Anvils will accurately measure Out-of-Round-
ness, Ovalness and Taper.

For more data circle 532 on Postpaid Card

BARCO BULLETIN Q200 on GOLD WATERLESS DEGREASING

Request Newest Data on
SAFE Care of all Machinery,
Motors, Tools, Dies, Fixtures,
Etc. • Approved by Under-
writers' Labs. Inc.



BARCO Chemical Products Co.
701 S. LaSalle St. Chicago 5, Illinois

For more data circle 532 on Postpaid Card



Also Available
in LARGER SIZES

CONTINENTAL Certified DRILLS

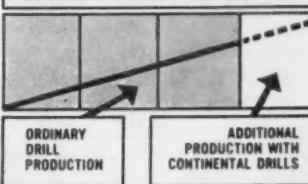


SHARP

Today's drilling problems on both
standard and new metals require
twist drills with *something extra* built
into them. That's why Continental
drills are so acceptable to leading
cost conscious production plants.
Ask your industrial jobber

MORE HOLES PER DRILL

MAJOR PRODUCTION PLANTS PROVE
CONTINENTAL DRILLS LAST LONGER!



WAREHOUSES:
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CO 7-5662

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RA 3-1287

TACOMA, WASH.
2006 Center Street
MA 7-3434



CONTINENTAL
DRILL CORPORATION
555 W. Adams St., Chicago 6, Illinois

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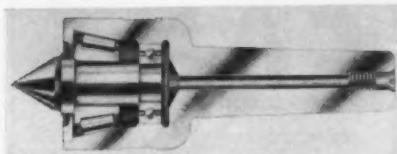
March, 1958

modern machine shop 273

new shop equipment . . .

SELF-ADJUSTING LIVE CENTER

The precision built live center, produced by the J and S Tool Co., 871 Dorsa Ave., Livingston, N. J., features a simple six part design. The one piece main body, serving as a cup for the roller bearing on which the spindle turns, permits use of a much



J and S Live Center has six part design

greater than normal capacity bearing in a standard size body. Automatic wear adjustment takes place as the tapered roller bearing moves back when wear occurs. The ball bearing is thus pushed back, retaining concentricity; eliminating eccentricity and bearing failure due to neglect of a manual take-up adjustment.

The live center has a concentricity of less than 0.0001 t.i.r. Both the conical and cylindrical bores of the body are ground at the same setting in the work head. The point is ground under load in its own bearings to insure running dead true. The heavy spindle with wide spaced bearing design minimizes deflection.

Guaranteed by the manufacturer for 2,000 hours or one year, the



**... alloy steel bars, billets and forgings
in sizes, shapes and treatments for every need!**

All seven of our warehouses are staffed and supplied to fill your alloy steel requirements promptly whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow".

Write today for Wheelock, Lovejoy Data Sheets containing complete information on grades, applications, physical properties, tests, heat treating, etc.

**NEAR YOU . . . Warehouse Service — Cambridge • Cleveland
Chicago • Hillside, N. J. • Detroit • Buffalo • Cincinnati
In Canada — Sanderson-Newbould, Ltd., Montreal and Toronto**

WHEELOCK, LOVEJOY & COMPANY, INC.

139 Sidney Street, Cambridge 39, Mass.

For more data circle 535 on Postpaid Card

274 modern machine shop

March, 1958

HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- **SQUARE BLADES**
Easily Replaced.
- Simple, Accurate
Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



PAT.
SHELL
MILL

SEND FOR BULLETIN

W.T. HOWALD
MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N.Y.

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FLYNN BORING HEADS



LEADING NAME IN
BORING HEADS FOR 40 YEARS
19 MODELS Write for catalog

FLYNN MANUFACTURING CO.
170 FLOWERDALE AVE. • DETROIT 20, MICH.

For more data circle 537 on Postpaid Card

March, 1958

TREPANS

► Maximum
Diameter — 5/8 inch.

► For fast-production,
multi-spindle
machines.

► Specially heat-treated,
high speed steel.

► With back taper or
radial relief.

► Made by
specialists in
the design
of small
tools.



WOODRUFF & STOKES CO.
INCORPORATED

Bldg. 32, 357 Lincoln St., Hingham, Massachusetts

For more data circle 538 on Postpaid Card

modern machine shop 275

new shop equipment . . .

live centers are made in several standard sizes and capacities to meet varying machine shop requirements.

For more data circle 109 on Postpaid Card

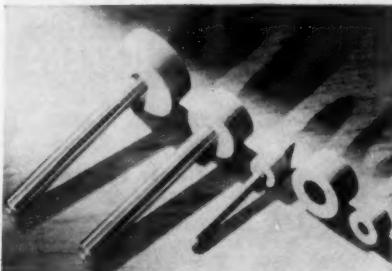
★ modern machine shop ★

DIAMOND POINTS AND HONES

Expansion of its industrial products line to include diamond mounted points and hones has been announced by the Abrasives Division, Elgin National Watch Co., Elgin, Illinois.

Mounted points come in sizes ranging from 3/32 to 1 inch in diameter and the hones in standard sizes, with specials available.

A special blending process controls concentration and uniform distribution of virgin diamond in the resinoid



Elgin Diamond Mounted Points range in size from 3/32 to 1 inch diameters

bonded tools, assuring rapid cutting and long life performance.

The points are mounted on solid carbide shanks in order to provide maximum tool rigidity for grinding accuracy and efficiency in hardened steel and all carbide die finishing operations.

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WARDWELL

3803 Ridge Road
Cleveland 9, Ohio

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**Automatic
Universal**

Flute Grinder

Grinds straight or spiral flutes from solid, including carbides, in tools such as:

- Drills as small as 1/16 inch in dia.
- Spiral or straight taper reamers.
- Spiral or straight milling cutters and end mills.

ALSO:

- Sharpens saws up to 12 inch in diameter and in gangs up to 7 3/4" long.

AUTOMATIC INDEX FEED

Write for free Bulletin 90 FS

Hammond
OF KALAMAZOO

2 IN 1 NO-DUST GRINDER

SAVE OVER 30% FLOOR SPACE
THE HAMMOND WAY

DUST WAY
DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Save floor space — requires only 6½ square feet.
- For 10", 12", and 14" wheels.
- Write for Catalog.

BUILT-IN DUST-Collector

Hammond Machinery Builders, Inc.
1618 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

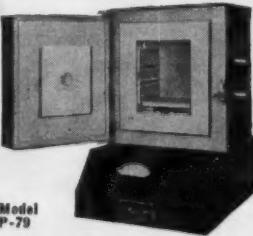
See us at Booth 1704, ASTE Show, May 1-8, Phila.
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PRODUCED AND PRICED RIGHT FOR YOUR ELECTRIC FURNACE NEEDS

DYNA-TROL

MODEL NO.	FIRING CHAMBER (H.W.D.)	PRICE (\$300.00 to 2000°)	PRICE (400° to 2300°)
P46	4½" x 4½" x 8"	\$90.00	\$110.00
P79	8" x 8" x 9"	\$205.00	\$225.00
P918	9" x 9" x 18"	\$480.00	\$528.00
P414	14" x 14" x 14"	\$525.00	\$603.25
P124	12" x 12" x 24"	\$715.00	\$822.25
P818	18" x 18" x 18"	\$775.00	\$867.50
P136	18" x 18" x 36"	\$1125.00	\$1312.50

Automatic Controls Available on all Models



- Infinite zone temperature control
- Zone temperature indication by Pyrometer Selector Switch
- Automatic hold and cut-off instrument available
- Patented element holders
- Infinite variety of time-temperature curves obtainable
- Rugged construction

For more data circle 542 on Postpaid Card

March, 1958

modern machine shop 277

ALL TYPES OF REAMERS

... THE RIGHT
ONE FOR
YOUR
JOB

Piloted
Special Lengths
Special Diameters
Combination Cutting

Schmarje

CARBIDE REAMERS STRAIGHT OR TAPER SHANK

Send drawings for Prompt Quotations

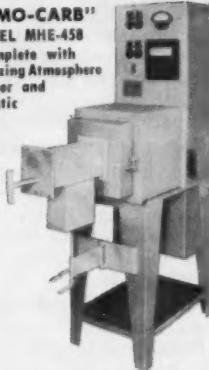
SCHMARJE TOOL COMPANY

Carbide Reamers • Form Tools

MUSCATINE 1, IOWA

For more data circle 541 on Postpaid Card

"ATMO-CARB"
MODEL MH-45B
Complete with
Carburizing Atmosphere
Generator and
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Chester 71, Pa.

CUT LAYOUT TIME WITH



**Finest edge holding—
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DISSTON **DISS-CROLOY CIRCULAR SAW**

For non-ferrous metals and plastics

Maximum hardness combines with toughness! Disston Diss-Croloy Circular Saws are scientifically heat-treated for hardness. For toughness, they're made of high-carbon, high-chrome steel. That's how Disston can give you a saw with superior edge holding qualities.

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Disston Division, H. K. Porter Company, Inc., Phila. 35, Pa.

H. K. PORTER COMPANY, INC.
DISSTON DIVISION

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new shop equipment . . .

RING, CIRCLE AND SLITTING SHEARS ARE MODERNIZED

Niagara Machine and Tool Works, Buffalo 11, N. Y., has announced that its modernized ring and circle, circle, and slitting shears are now available in several models which have been designed to meet a wide range of metal cutting requirements.

The versatile ring and circle shear cuts circular discs, holes, rings, irregular outlines and straight lines in blanks of any shape.

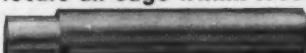
Features include: all-welded steel bed; cutting head of box type construction; adjustable swing and slitting gages; inclined lower cutter to keep off-fall material flat and usable and an all steel floor stand (optional). Two power and two hand models are available for cutting circles from 3½ to 44 inches in diameter (the rated capacity is 20 gauge mild steel).

Niagara Circle Shears, featuring simplified construction, are used to cut



Niagara Modernized Ring and Circle Shear

1 Minute
to locate an edge within .0005"



JUMP EDGE FINDER

PRICE \$2.50 Complete satisfaction — or full refund.

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Large Precision Machining

Done to your specifications

We have 22 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

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CUT LAYOUT TIME WITH **MICRO-SCALE**



THE NEW MICRO-SCALE

eliminates the need for gauge blocks in radii layout—saves you TIME—MONEY—ENERGY. Permits quick, accurate settings of any dimension within its range. Just dial it and set it! Exact measurements in seconds! Simply (1) turn knob to desired reading on graduated disc and scale, and (2) set divider points on "O" or helical line on barrel. Low cost. A real time-saver for drafting, layout, design, checking and inspection. Four sizes: 6, 12, 18 and 24" maximum length.

Write for data sheet and prices.

TRICO **MACHINE PRODUCTS CORP.**
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get ALL universal features
plus real economy...

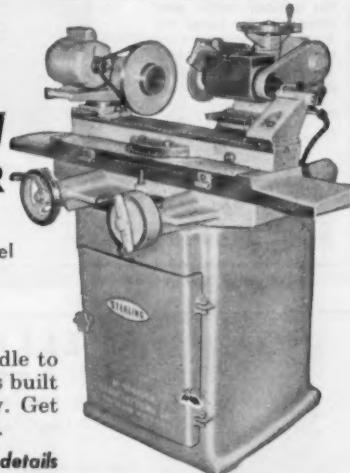
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Sterling Features include...

- 25° Tilting Spindle
- 180° Table Swivel
- 360° Spindle Rotation
- 2 Speed Table
- Anti-Friction Table
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From the 2-speed motorized 25° Tilting Spindle to the heavy cast base the STERLING "G-2" is built for easier operation with maximum accuracy. Get more cost saving features for less investment.

See your "STERLING" Dealer or write TODAY for details



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Manufacturers of STERLING
Tool & Cutter Grinders and
Drill Grinders

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new shop equipment . . .

circular discs or arcs and for slitting. The vertically adjustable upper cutter is parallel to the lower cutter, which has a lateral adjustment. Cuts start at the edge of the blank with off-fall material curling away as scrap. Two power and three hand models (capac-

ity of from 16 to 20 gauge mild steel) will cut circles ranging from 3 to 60 inches in diameter.

Niagara Rotary Slitting Shears are the cutting heads of circle shears offered as individual units for bolting to a bench. Claimed to be more practical than snips for slitting long sheets, they are offered in two power and two hand models (capacity of from 16 to 20 gauge mild steel).

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Made for small precision work found in all sized shops. Meets your most exacting requirements; releases large capacity borers for heavier jobs. Investigate the savings made possible with the Linley Jig Borer. An inquiry card mailed today will bring you detailed information promptly.

Table Size: 7" x 17 1/2"

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TYPE INSTRUMENT LATHE**

A heavy duty compound slide rest, which has been designed to fit all standard jewelers type instrument lathes, is now available from Louis Levin and Son, Inc., 3610 South Broadway, Los Angeles 7, California.

It is of a completely new design and made exceptionally rugged for precise turning, as well as continuous service. The lead screw dials are one inch in diameter and have a non-glare finish. The swivel slide is locked with two tee bolts and will hold securely under any strain. Both slides are fitted with micrometer stops.

This slide rest may be supplied with screw feeds for both slides or with lever feeds on either or both slides. A

**SPELLMACO "SPOTTERS"**

**A matched set of transfer punches
for toolmakers, machinists and tool cribs**

Used for transferring location of threaded, drilled
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by $\frac{1}{64}$ "—plus handy $1\frac{1}{2}$ " size. Length $4\frac{1}{8}$ ". ONLY \$17.90.
Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

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Patent No. 2,612,044
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Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and
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8 sizes, from $\frac{1}{8}$ " to $\frac{1}{2}$ "
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- One of the many cost-saving applications of CERROTECHNICS involves the holding of irregular work pieces rigidly by nesting them in low-melting, non-shrinking CERRO ALLOYS. Illustrated is a jet engine "pinetree" turbine bucket held snugly—with Cerro Alloy—in a special fixture for grinding. After grinding, the bucket is removed by melting out the matrix in hot water . . . eliminating danger of annealing or burning the workpiece.



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March, 1958

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TABLES AND
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to speed up production
on Milling Machines
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USED IN ALL INDUSTRIES . . .

Everywhere

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Rotary Table. Cross
feed slides and rotary
Feed. Converts for ver-
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Solve difficult angle jobs on
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in such operations as drilling,
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jaw sizes: $1\frac{1}{4}$ ", $2\frac{1}{4}$ ", 3", 4",
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Ask for new catalog No. 205 for complete line,
details and prices.

123

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8399 South Chicago Ave.

Chicago 17, Illinois

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modern machine shop 281

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GISHOLT
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NEW MACHINE GUARANTEE

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MARKING**

Model No. 4

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- Simple Operation
- Perfect Alignment
- Uniform Depth

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DETROIT, MICHIGAN U.S.A.
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DETROIT, MICHIGAN U.S.A.

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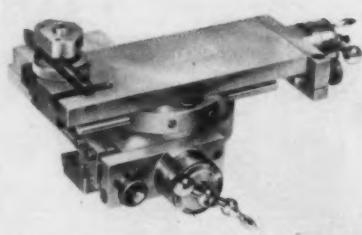
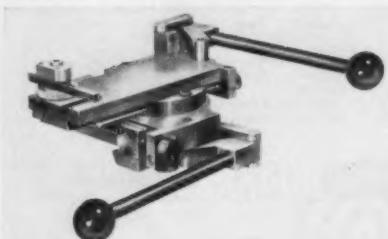


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(Top) Louis Levin ABLX Heavy Duty Slide Rest; (Bottom) Type ABLW Slide Rest

tool post eliminates the danger of breaking the tee slots when clamping a tool.

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**12 3/4 INCH GENERAL
PURPOSE LATHE**

Atlas Press Co., Clausing Division, 26110 North Pitcher St., Kalamazoo, Mich., has announced the Clausing 5400 Series 12 3/4 inch lathes which are fast, accurate, powerful general purpose lathes of wide adaptability for the efficient machining of all work within their capacities. Flame hardened bed ways are standard equipment on the Clausing. Vee ways and flat ways are precision ground to close

March, 1958

HOLD IT... Mister!



WITH A
**WESTCOTT
CHUCK**

**TOP QUALITY
CHUCKS**

SINCE 1872



- PRECISION MANUFACTURED
- UNIVERSAL CHUCKS: .003" guaranteed accuracy
- Send for Catalog

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March, 1958

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12" OA, 9" FLUTE

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9/64	1.75	7/16	3.30
5/32	1.75	29/64	3.60
11/64	1.85	15/32	3.60
3/16	1.85	31/64	3.60
13/64	1.95	1/2	3.60
7/32	1.95	33/64	4.20
15/64	2.05	17/32	4.20
1/4	2.05	35/64	4.50
17/64	2.15	9/16	4.50
9/32	2.15	37/64	4.75
19/64	2.25	19/32	4.75
5/16	2.25	39/64	5.00
21/64	2.50	5/8	5.00
11/32	2.50	21/32	5.40
23/64	2.75	11/16	5.80
3/8	2.75	23/32	6.25
25/64	3.05	3/4	6.75
13/32	3.05		

18" OA, 13 1/2"-14" FLUTE

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
7/32	4.10	19/32	9.50
1/4	4.10	5/8	10.00
9/32	4.75	41/64	11.00
5/16	4.75	21/32	11.00
11/32	5.25	43/64	12.00
3/8	5.25	11/16	12.00
13/32	6.00	45/64	13.00
7/16	6.00	23/32	13.00
15/32	6.50	47/64	14.00
1/2	7.00	3/4	14.00
17/32	8.50		

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IMMEDIATE DELIVERY!

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modern machine shop 283

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TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.



MODEST DIE CHARGES on larger quantities! Here is where our regular production toolings apply to advantage...to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.



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DIVISION**

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284 modern machine shop

new shop equipment . . .

tolerances. The headstock spindle turns on Timken "Zero Precision" tapered roller bearings. The spindle is of forged steel with a 1 1/8 inch bore, 1-1/16 inch lever type collet capacity and a hardened nose.

A quick change mechanism provides instant selection of 54 threads or feeds—27 are obtained by merely shifting two levers on the gear box, and an additional 27 by shifting the position of a sliding gear. The apron is double walled; gears and shafts turn in a bath of oil.

The variable speed countershaft makes instantly available any speed from 35 to 270 r.p.m. and 210 to 1,600 r.p.m. while the lathe is running. Speeds are changed by turning a handwheel on the front of the lathe cabinet. The clutch and brake, controlled by a lever on the lathe cabinet, permit instant starts and stops of the lathe spindle without stopping the



Clausing Series 5400 General Purpose Lathe

March, 1958

New
LUBRI-CUT #3
(in bulk form)
for hard and
runny materials.

- zirconium
- titanium
- molybdenum
- A-286
- Hi-tuf
- and others

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FOR ALL MODERN
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LUBRI-CUT
A SPECIAL CUTTING
COMPOUND



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A Division of Darco
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Lubri-Cut
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- In sets, assorted, or singly

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March, 1958

Greenerd

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ARBOR & HYDRAULIC



**ASSEMBLING
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**ARBOR
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1/4
to
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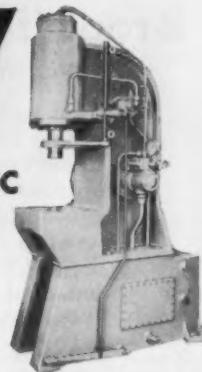


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GREENERD Presses may be furnished to J.I.C. standards.

**HYDRAULIC
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75
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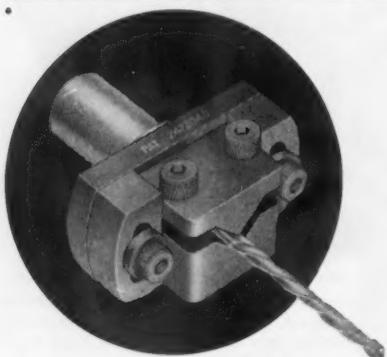
motor—the clutch is multiple disc, dry operating, with heat treated steel plates. Power is transmitted to the countershaft spindle through variable speed cog belts, and to the lathe spindle through three vee belts. The drive mechanism has been built for heavy duty use and it has five ball bearings

for smoothness and long service life.

Series 5400 Lathes are also available with ten speed ball bearing countershaft that provides speeds between 35 and 1,600 r.p.m. Three vee belts power the lathe spindle.

Condensed specifications are as follows: 12 $\frac{3}{4}$ inch swing over bed, 7 $\frac{5}{8}$ inch over cross slide; 23, 35 and 48 $\frac{1}{2}$ inch centers; 1 $\frac{1}{8}$ inch hole through spindle; 54 thread range; No. 3 MT tailstock; base, 3/16 inch steel plate; motor recommended 1 to 1 $\frac{1}{2}$ h.p., one or two speed.

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in half the time

Brookfield Tool Holders make tool set-ups easy!

Now, without bushings or collets, on the first try you can set up drills, counterbores, reamers or cutters for almost any machining operation. Precision ground V-jaw vises, Brookfield Tool Holders make even toughest set-ups a cinch. With one wrench, insert the tool, tighten the jaw, then float the tool into dead center position and tighten. It's as easy as that!

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**Aetna Mounting
Bracket for Mystic
Coolant Generators**



TAP BUSHINGS

Drives all standard taps from No. 0 to 1 $\frac{1}{2}$ " and pipe taps from $\frac{1}{8}$ " to 1". Five o.d. sizes.

LESS TAP BREAKAGE
LESS TAP WEAR

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TRUE POINT DRILL SHARPENER

for Drills 41 - 60 and
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A properly sharpened drill cuts faster — more accurately and is less likely to break.

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UP-TO-DATE TOOL CO.
P. O. Box 99, Station A, Worcester 8, Mass.

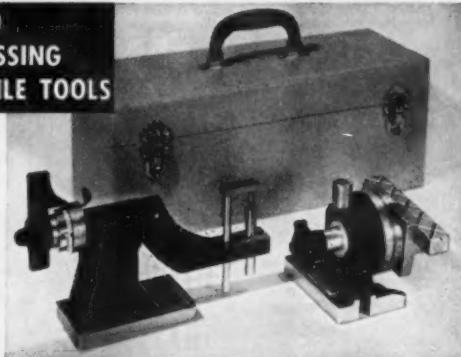
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Now ANGLE TANGENT TO RADIUS WHEEL DRESSING WITH NEW VERSATILE TOOLS

MIGHTY GOOD AT ANY PRICE BUT TOPS AT ONLY \$149.50

(Both tools including diamonds)

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1"; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.



Our fixtures will dress most radii and angles tangent to each other, similar to those shown below.

FREE handsome, wooden storage box.
Write for complete information.

Distributorship available in select territories.

ROTHFUSS TOOL

COMPANY

P. O. BOX 2693, ELMWOOD STATION

PROVIDENCE 7, R. I.

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March, 1958

modern machine shop 287

MORRISON 1" AUTOMATIC KEYSEATER

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MAGNETIC**

**CHIP
REMOVER**

THIS HAND IS IN THE CHIPS! Yes, and the chips are not in your eyes or hair or ways of machines. The Heimann Magnetic Chip Remover gets chips out of blind holes rapidly, cleanly, safely. It's a lastingly efficient, permanent magnet in a knurled aluminum holder. Send it in after chips and it comes out covered with them.

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**HEIMANN MFG. CO.,
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Diamond Wheel Dressers

Guaranteed to be full, individual stones, mounted in $7/16 \times 6"$ cold rolled shanks

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$\frac{3}{4}$	6.00
1	8.25
$1\frac{1}{2}$	12.00
2	16.00



* These diamonds can be set in any shank to your specification for \$1.00 each extra.

* Prompt resetting service

Allstate Diamond Products, Inc.

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* Dealers' inquiries invited

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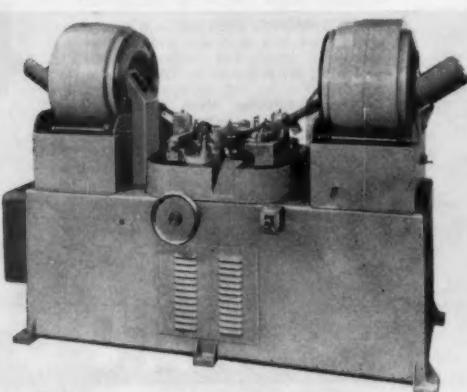
been announced by Aetna Manufacturing Co., 193 South York St., Bensenville, Illinois.

This hanger type bracket permits the installation of the air line inlets to enter the tank from any direction. It provides for easy removal and snap-in of the generator tank assembly for coolant refill. Functioning on the principle of a "hook clamp," the flange of the tank top is held firmly by the top of the bracket. The bottom and side are securely held in place by the spring tension of the base. Holes in the back of the bracket provide for mounting by $3/16$ inch screws or bolts. For more data circle 114 on Postpaid Card

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PLANETARY THREAD ROLLING MACHINE

The Model 125A Planetary Thread Rolling Machine, that thread rolls screws, bolts and nails at speeds of 600 to 800 pieces per minute, has re-



Prutton Planetary Thread Rolling Machine



**DRILL and
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BUSHINGS**
Frictionless
—Rotary

For core drilling, T.C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

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to your specification

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**STANDARD
TAPER PINS**



The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bar stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.

Write for complete catalog giving information on taper pins, Woodruff keys, machine keys and machine rocks.

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 572 on Postpaid Card

March, 1958

*When You Need
Turning Space
for "CLOSE-QUARTERS"
Tapping*



**WALTON
TAP
EXTENSIONS**
**QUICKLY
PROVIDE
NEEDED
LENGTH**

With these specialized tools in your crib you are prepared to meet a production tapping delay that can increase costs unnecessarily.



In sets of two 5" extensions for use singly or in combination. Fit all standard hand taps (4-flute, 3-flute, and 2-flute styles) from No. 10 (3/16") to 1" inclusive. Special alloy, heat-treated steel.

Stock Walton Tap Extensions as insurance against a "close-quarters" tapping problem in your shop.

Write for DATA FOLDER No. 10. Contains specifications and prices of all Walton time-and-labor saving tools.



For more data circle 573 on Postpaid Card

modern machine shop 289

new shop equipment . . .

cently been announced by Prutton Corp., 5293 West 130th St., Cleveland 30, Ohio.

According to the manufacturer, the machine handles overall blank stock lengths up to 3 inches and diameters from No. 4 to 5/16 inch. Operations performed are thread rolling, roll

forming, knurling, marking, serrating and necking.

Features that are of particular interest to production men include: rear loading during production; cradled hopper with external drive free of obstructions; end mounted vibrator for peak efficiency; hardened and ground feed rolls; rapid adjusting feed rail width; micrometer feed rail positioner; expanding die mandrel for truing die; and thinwall ring die that can be set up in ten minutes to perfect concentricity. In addition to high output, the Prutton Thread Roller features fast set-up, which makes short runs highly profitable.

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Over 300 types and sizes of PRECISION SURFACES for LAYOUT INSPECTION and ASSEMBLY



Close tolerance precision work demands Precision Surfaces, and Challenge offers the world's widest line of standard precision surface equipment. In addition, if your requirements include large, special surface or floor plates (in Semi-Steel or Granite), Challenge's Custom Engineering can plan and produce them for you.

ASK FOR LATEST CHALLENGE CATALOG SHOWING THE MOST COMPLETE LINE OF

Angle Plates	Surface Plates	Straight Edges
V-Blocks	Floor Plates	Welding Tables
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Handy new Catalog No. 838-W includes complete specifications and prices. See your Industrial Distributor or write Challenge for your free copy.

THE CHALLENGE MACHINERY COMPANY

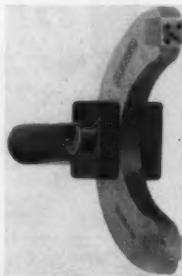
MMS-3 Grand Haven, Michigan

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★ m m s ★

TANDEM TYPE DIAMOND TOOL

Tandemite,
P.O. Box 4736,
Cleveland 26,
Ohio, has introduced the



Tandemite
Diamond Tool

CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

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COMBINATION DRILL & COUNTERSINKS
SPIRAL FLUTES
STANDARDS AND SPECIALS

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DIES and individual
metal PARTS



For
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• MAINTENANCE

MODEL

TR 78
with filter
and pump
\$294.00

Get a

GRAYMILLS AGITOR Parts Washer

1. No heating, no vapor
 2. Flush chips and dirt from metal parts with filtered solvent
 3. Clean out blind holes and cavities
 4. Do it thoroughly, fast and safely
- Send for catalog and prices

152

GRAYMILLS CORP.

3269 N. Lincoln Ave.
Chicago 13, Ill.

For more data circle 577 on Postpaid Card

March, 1958

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FOR YOUR CONVENIENCE*

Miccro
Supreme Spray



LAY-OUT DYE

(Purple)

A new, easy-to-use, dependable, spray Lay-Out Dye for tool, die, pattern, or template layout on metal. Dries instantly—shows up in sharp relief.

Also Still Available...

Miccro
Supreme



LAY-OUT AND
IDENTIFICATION
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For layout on metal and quick identification of bar stock, sheets, strips, or parts. Also dries instantly and shows up in sharp relief. Available in brush-in-cap cans and larger containers.

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CHEMICAL COMPANY**

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modern machine shop 291

new shop equipment . . .

Tandemite Diamond Tool. The Tandemite principle offers a pair of dressing devices in tandem. The two points of contact reduce the amount of pressure, heat and friction on the diamond and result in long tool life and increased wheel life. Perfectly formed wheels in one pass are claimed and

improved surface finishes are reported for all ground parts.

Mechanical indexing devices, or the need to hand turn the ordinary diamond tool are said to be eliminated with Tandemite Tools.

The company claims that this Tandemite Diamond Tool can dress both sides of a wheel, as well as the face, and further states the tool can dress to an accurate 90 degree shoulder.

Special forms for plunge type grinding are available.

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NOW...Cold Forged CAP SCREWS with the Setko "Perfect-Hole" Socket!



A complete line of Cold Forged Socket Head Cap Screws produced on specially designed machinery assures perfect, chip-free sockets every time. Hex keys insert completely into the "Perfect-Hole" socket perfectly.

You get maximum gripping area for equally distributed tightening torque . . . Threads are rolled to unmatched precision . . . Available with or without knurled heads in high grade Alloy Steel. Size 8 to $\frac{3}{8}$. . . Isothermal heat treated for extra strength.

Send for the Free Setko Bullseye "Sampler" Puzzle. Get your sample Cap Screws in this fascinating puzzle . . . Compare these "Perfect-Hole" sockets for yourself. Send today for your free Bullseye "Sampler" Puzzle and complete information.



**Set
Screw & Mfg. Co.**

324

152 Main St., Bartlett, Ill. (Chicago Suburb)

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GRAIN STRUCTURE follows smooth pattern . . . has added strength.

MULTIPLE USE FACING CUTTER

A one piece face mill, having a straight shank with a square end drive, has been developed by the Nelco Tool Co., Inc., Manchester, Conn., primarily designed for use



Nelco Facing Cutter



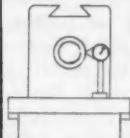
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and "Pony"
CLAMPS

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**SAVAGE
NIBBLING MACHINES**

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or TEMPLATE CUTTING
- SPEED WITH ACCURACY NO SECONDARY OPERATIONS
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Up to $\frac{3}{4}$ " Capacity
in MILD STEEL

QUOTATION ON REQUEST

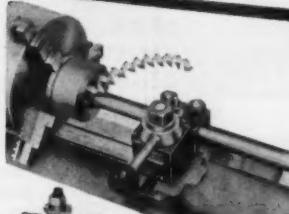
W.J. SAVAGE COMPANY

KNOXVILLE TENNESSEE

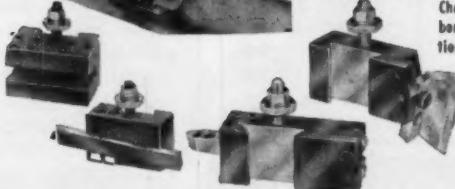
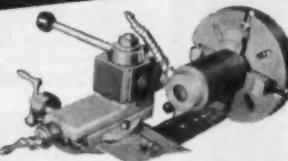
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NEW!

Aloris Holder for Carbide Triangular Inserts.
Greater rigidity, versatility, efficiency & economy



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ALORIS TOOL CO., INC.

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new shop equipment . . .

in automation equipment where positive and repetitive location is required.

The square end shank has been designed with fine pitch thread so the adjustable stop can be preset for depth of cut.

The shank also has the added feature of set screw flats, making it pos-

sible to mount it in the standard 50-2 straight shank adapter. This tool extends the range of standard set screw type shanks up to 5 inch diameter cutters.

The cutter tips are solid carbide, sandwich brazed to the steel body with integral straight steel shank with 45 degree chamfer. The various series have been designed with proper rake angles and carbide grades to give best performance on required materials. The Series 100 is for milling alloy steel; Series 200 for milling mild steel; Series 300 for milling cast iron and bronze; and Series 400 is for milling aluminum, magnesium, plastics and brass. For more data circle 117 on Postpaid Card

TRIPLE TEMPERED TAPS

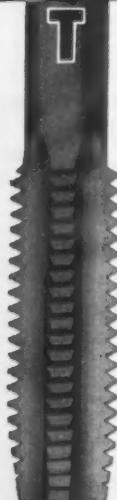
A STANDARD WITH



SOSSNER
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FULL VALUE

Yes! Sossner taps are tempered, not just once, not just twice, but THREE TIMES. The result...a tougher, more reliable, longer lasting tap...less chipping, breakage.

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Permanent
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SPIRAL TAPS

The most complete line

- Regular
- Hook
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- Double Scoop



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SPIRAL FLUTED CHUCKING REAMER

Fast reaming, smooth finish and long tool life are claimed to be possible with the spiral fluted chucking reamers recently introduced by Fastcut Tool Co., 7405 East Davison Ave., Detroit 12, Michigan.

The left hand spiral, right hand cut forces chips ahead of the

BREMIL
The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
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Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to $\frac{1}{4}$ " steel plate.

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IT—** *Comet*
BORING TOOLS
(H.S.S. and Carbide)

for Holes from
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STANDARD AND SPECIAL BORING, FACING
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COMET Tool Co.

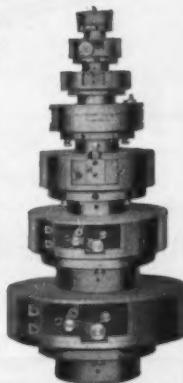
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Two-way tool feed
in 9, 12, 16, 20, 24,
30, 36, 40 and 46
sizes.

One-way tool feed
in 6, 9 and 12 sizes.
Automatic feed —
convenient tool ad-
justment — quick
feed reverse. Save
time and costly set-
ups.



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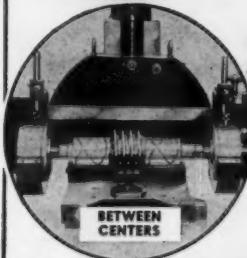
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FOR SPUR - WORM AND
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BETWEEN
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ABOVE PHOTO SHOWS
SET-UP FOR WORM GEARS
TO CHECK CENTER
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OF TEETH, RUNOUT, ETC.

Scale and Vernier, Ease of adjustment,
Convenient Features to hold Worm and Shaft on V-Blocks or Bushing.

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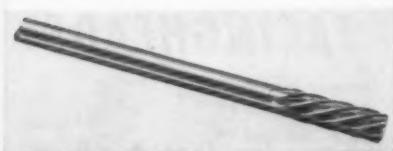
GEORGE SCHERR CO., Inc.

For more data circle 588 on Postpaid Card

March, 1958

modern machine shop 295

new shop equipment . . .



Fastcut Spiral Fluted Chucking Reamer

reamer, keeping it free of chips. Clogging is prevented and a smooth accurate finish is possible.

Long tool life and fast reaming are possible because the spiral flutes, being free of chips, readily allow the coolant to reach the cutting edges.

Fastcut Reamers have been constructed of high speed steel, specially heat treated for maximum resistance to wear. The sizes that are available range from $\frac{1}{8}$ to $\frac{1}{2}$ inch reamer diameter.

For more data circle
118 on Postpaid Card

★ m m s ★

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AVAILABLE IN
SHORT SERIES**

The N. A. Woodworth Co., Standard Products Division, 1300 East Nine Mile Rd., Detroit 20, Mich., has released a new series of Tork-Lok Arbors. Available from stock is the drawbar model of a shorter arbor and col-



You too can enjoy the proven superiority of Mistic Mist cooling . . . for one machine or a complete centralized system installation. This modern method of cooling permits increased production . . . better finishes . . . and tremendous savings in tool costs.

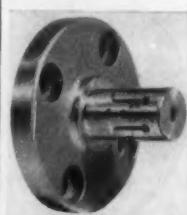
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Coolant
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Generators

Write for complete details today or
see your local Mistic Mist dealer.

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For more data circle 589 on Postpaid Card



**Woodworth Short
Series Tork-Lok Arbor**

**NEW
FLUSH PIN
AMPLIFIER**

**OFFERS 5 to 1
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- No dial indicator needed • No master required
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Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.



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"A Name To Remember"

— whenever your duplication requirements call for the standard tool items illustrated here. Stocks at ECONOMY are always complete — assuring you of quality and service.

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Milwaukee 14, Wisconsin

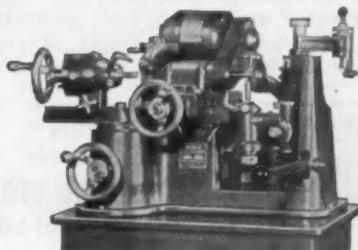
For more data circle 593 on Postpaid Card

March, 1958

modern machine shop 297

**HYBCO
TAP GRINDER**

**Sharpens Chamfers, Flutes
and Spiral Points**



MODEL 1100

- Capacities No. 0 Machine Screw to 1½" Hand Taps.

HENRY P. BOGGIS & CO.
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new shop equipment . . .

let. Designed primarily to answer the need for full support on short hole applications, the short series Tork-Lok also provides a more complete complement of workholding tools available off the shelf. Overall length of the arbor has been reduced to about 2/3

of the length of the standard series.

Interchangeable collets will cover the size range from $\frac{1}{2}$ inch to 2-9/16 inches. Collet expansion is 0.010 in the group from $\frac{1}{2}$ to $\frac{7}{8}$ inch and 0.020 in the group from $\frac{7}{8}$ inch to 2-9/16 inches.

For more data circle 119 on Postpaid Card

★ modern machine shop ★



\$175 each

- ★ SPEEDS PRODUCTION
- ★ CUTS WASTE
- ★ INCREASES PROFITS

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REMOTE CONTROLLED PNEUMATIC MARKER

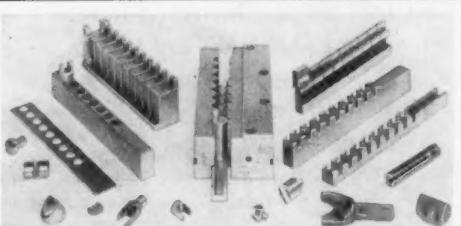
A pneumatic marker has been designed for complete automation by The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pennsylvania.

The equipment's simplicity, flexibility and durability fills the industrial need for a marking unit that will quickly and automatically stamp heat numbers, cut numbers and ingot numbers into hot rolled steel and do it accurately, clearly and safely.

The unit is operated by pushing buttons in a remote control cabinet which is placed any practical distance from where the actual marking is taking place. Simply by pushing buttons, the operator sets up the marking head, adjusts for slab thickness and activates the marking procedure. He is no longer required to work unnecessarily close to the hot rolled steel or the marking equipment. There is virtually no limit to how far removed the re-

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DERY Equalizing Gang Vise Jaws give simultaneous 3-point holding for small parts varying in diameter. They allow fast, precision straight or gang machining. Send sample or blueprint for quotation.



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BY A QUICK, EASY, INEXPENSIVE METHOD**

Your business letterhead will bring literature.

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Wilmertding, Pa.

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**MINIATURE
DRILL BUSHINGS**

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3"

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O.D., and Concentricity

Specials to your specifications

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Convention Hall, Philadelphia, May 1-8.

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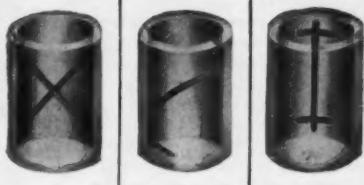
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Catalog.

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Send parts
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production
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... OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

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new shop equipment . . .

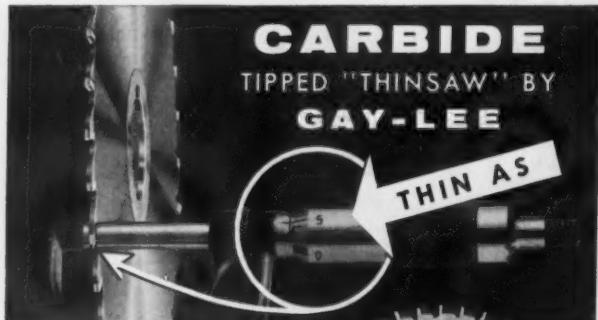
remote control cabinet can be from the marking unit, as there is no direct mechanical operating connection.

Each changeable type character on the marking head has a control button and an indicator dial on the remote control cabinet. The operator selects and sets up the correct sequence

of numbers and/or letters on the marking head simply by pressing the control buttons. The indicator dials, one for each changeable type character on marking head, lets the operator see the accuracy of his marking head setup.

The accompanying illustration shows a specially designed mounting application for the Pannier Remote Control Pneumatic Marker. Since positive identification marking depends

to a great extent upon the surface condition of the steel to be stamped, this special mounting has, incorporated into the stamping unit, a fully automatic raising and lowering system that always permits stamping to be done on a flat area. In stamping the surface of the slab or bloom, the automatic up and down adjustment permits stamping to be done on the upper, flat and rather smooth area instead of the bottom area where stamping clarity would be impaired by the rough, angular shear drag. The raising and lowering of the stamping unit is also controlled by the operator at



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- Thicknesses low as .030" ● Thickness tolerance can be held to .0001"
 - Wafer-thin for the most delicate work
 - Maintain positive alignment and rigidity
- Cut to full depth without runout
 - O. D. from 1½" to 10"

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Quick
Shipment on

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\$29.50
to
\$149.50

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READING BENCH KEYSEATER

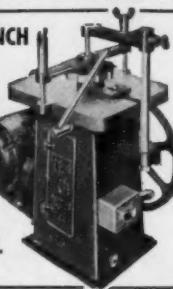
Portable — move directly to job; time saver for both small and large shops.

3 $\frac{1}{2}$ " stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



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Guaranteed Accuracy
Within .001"

Reading .001"

- SPEED
- PRECISION
- DEPENDABILITY

Full scale readings of
5"-6"-8"-10" available.
Also Foot with Scriber
to convert to Vernier
Height Gage.

Ask for catalog and prices
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MODERN TOOLS

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For more data circle 603 on Postpaid Card

Adjustable •MULTI-DRILL for Production Drilling

9" DRILLING AREA

AVAILABLE WITH 2 TO 8 SPINDLES

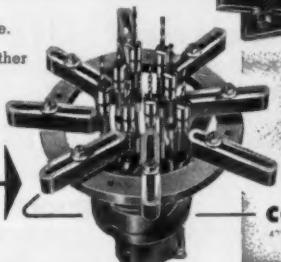
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle; $\frac{1}{2}$ " minimum center distances; Drill sizes $\frac{1}{16}$ " to $\frac{3}{8}$ ".
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

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Dependable Performance...
proven by industry



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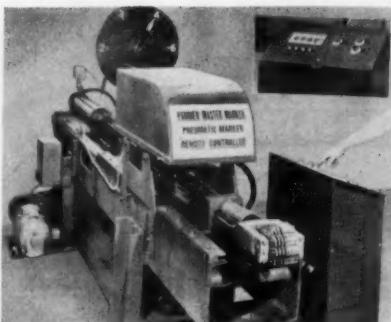
Model 900

March, 1958

modern machine shop 301

new shop equipment . . .

the remote control cabinet. A separate pushbutton control is provided for each size of slab, so that the hammer will be automatically positioned to stamp on the flat, smooth section of the steel. The operator can guard the accuracy of the stamping unit elevation in relation to size of the slab be-



Pannier Remote Controlled Pneumatic Marker

ACME TAPS from Stock!

Immediate shipment from factory stock, $\frac{3}{8}$ " to 3" diameters by eighths.

Write or wire for catalog prices, or for quotes on specials.

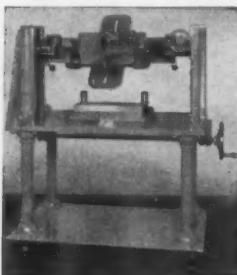


The Threading Specialists

30

HORSPOOL & ROMINE
MANUFACTURING CO., INC.
5850 Marshall St., Oakland 8, Calif.

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HAUSER Die Handler

For tool rooms, inspection, press and try-out departments.

Mobile or stationary. 180 degrees rotation of punch. Locks in any position. 24" x 40" base table. Ball bearing construction.

Dealer inquiries invited.

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HAUSER MFG. CO. 234 MILL STREET
ROCHESTER 14, N. Y.

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Quality Control plus Cost Control

Wilder MICRO-PROJECTOR with VERTICAL LIGHT BEAM

New model long range measuring stage
1" x 4" reading to .0005".

DO IT BETTER

Full set of lenses between
10X and 100X magnifica-
tions.

QUICKER

Completely versatile. Avail-
able as a basic unit for
production inspection or as
a completely equipped con-
tour measuring projector.

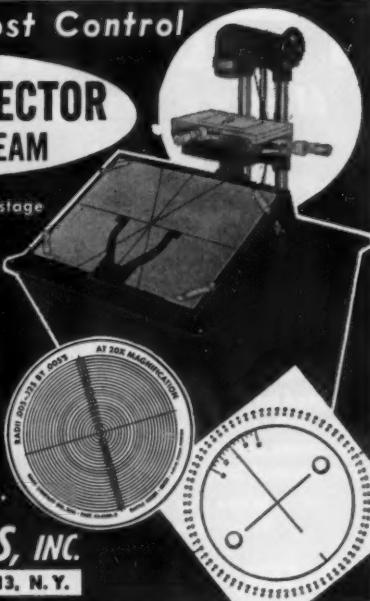
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OPTO-METRIC TOOLS, INC.

137-MM VARICK STREET • NEW YORK 13, N.Y.

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MORE EFFICIENCY — LESS WORK

THE MEDELTON POWERROLL AUTOMATIC COIL CRADLE

Every Stamping Room Needs One

One man loads it in a minute . . . no hoists . . . coils roll on . . . no lifting . . . no danger of slippage.

No operator fatigue on hand-feed jobs . . . slack loop always maintained . . . steady, sure feed . . . spoilage minimized. Less space needed . . . cradle butts against press . . . can be moved to other presses when needed . . . slack stored above cradle.

Model R-104 for 10" widths, 1000 lb. coils \$325
Model R-204 for 13" widths, 2000 lb. coils \$405

Model R-304 Handles stock to 24" wide,
48" diameter, weight to 3000 lbs.
Price on application.

Attractive
Discount to Dealers
Write for descriptive folder



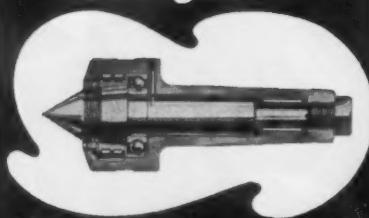
medelton Company, Inc.

Toolmakers • Designers • Dies • Stampings

335 E. 142 ST., Bronx 54, N.Y.

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NIELSEN
Heavy Duty
Live Centers

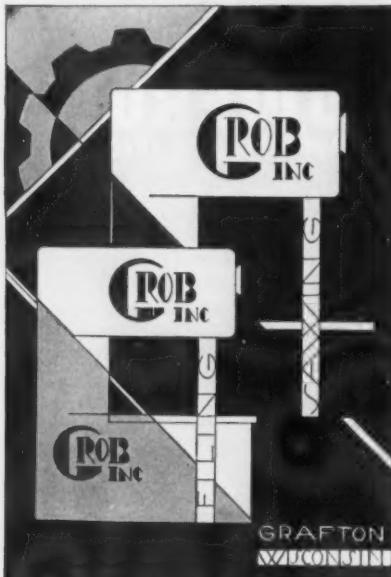


Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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M on live centers*

NIELSEN, INC., LAWTON, MICHIGAN

For more data circle 609 on Postpaid Card



For more data circle 610 on Postpaid Card

304 modern machine shop

new shop equipment . . .

them. The unit has been designed to be actuated from punch card or punch tape.

For more data circle 120 on Postpaid Card

★ modern machine shop ★

**DUST COLLECTOR
IS 53 INCHES HIGH**

A 53 inch high Junior Cyclone DusKolector has been developed by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

The Junior DusKolector is available in two capacities, 400 and 600 c.f.m., and operates on the same principle as the larger Cyclone types — centrifugal precipitation and gravitation for the removal of larger particles. The latter are deposited in the removable receptacle in the base. Smaller particles are exhausted out-



Hammond JCB-4 Junior Cyclone DusKolector

March, 1958

Combination 607 Angle Iron Shear and 95 Hydraulic Press

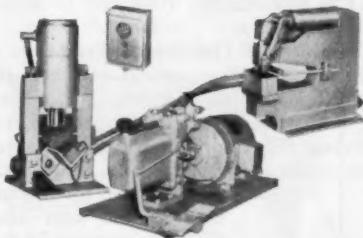


Illustration shows Whitney 607 Shear used in conjunction with 95 Hydraulic Press. By means of 2 way selector valve and 4 hoses use of shear or press can be quickly changed. Shear has 18 ton capacity... 1 3/4" stroke. Press has 12 1/2 ton capacity... 10" depth of throat.

Write for catalog

W. A. WHITNEY MFG. CO.
604 RACE STREET ROCKFORD, ILL.

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GOTHA
PRODUCTION MACHINE TOOLS

Automatic Air-Hydraulic Drill Units

**MODEL
AHD102**



GOTHA, INC.
Box 430A3
Harvey, Ill.

- 4" OR 6" STROKE
 - BUILT IN CONTROLS
 - 1/2" CAP. IN MILD STEEL
 - 360-3600 RPM, 1 HP
 - #2 M.T. OR 1/2" JACOBS CHUCK

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What is your LUBRICATING PROBLEM?

LATHE CENTER LUBRICATION
SCORING-GALLING

GRINDING CENTERS
LUBRICANT WASHOUT

DRAWING
SCORE MARKS-DIE WEAR

STEADY RESTS
WORK PIECE DAMAGE

PRESS FITS
SCORING-SEIZING

DIE POSTS
WEAR-FREEZING

**CMD Lube has solved many
like it with excellent results.
Perhaps CMD will be your
answer, too!**

**CHECK AND
SEND IN FOR
SAMPLE**



Anti-Scoring Lubricant
**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

1910 West 66th Street, Chicago 2, Illinois

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new shop equipment . . .

doors or trapped in a bag attached to the outlet. The bag is easily removed and equipped with a zipper for quick cleaning. With the bag style, the air is recirculated and heat is thus saved.

To prevent clogging of the blower wheel, even when sticky or stringy materials are being collected, the

wheel is mounted on the exhaust side rather than the inlet side. Also, the wheel is a self-cleaning, paddle type and is dynamically balanced to minimize vibration.

The Junior DusKolector requires a minimum of floor space and can be tucked in almost anywhere. Additional floor space can be conserved by turning the bag with the longer portion upward, with the bag being sup-

ported by a rod. Casters can also be inserted in the base to make the unit portable. 400 c.f.m. models operate on $\frac{1}{2}$ h.p. motor and 600 c.f.m. units require a 1 h.p. motor. The Junior DusKolector is said to be ideal for collecting dust from light and medium dust creating sources.

For more data circle 121 on Postpaid Card

★ m m s ★

HIGH SPEED HEAVY DUTY POWER DRILL

Whitman and Barnes, 40050 Plymouth Rd., Plymouth, Mich., has announced a complete series of high speed heavy duty power drills.

These drills are of the same length as screw machine drills, but have a

SAWS
for the
PRICE of
... use the **WELLS 49A**
for **Horizontal Cut-off**
and **Vertical Band Sawing**

The Wells 49A is a dual-purpose machine designed for shop or "job-site" work. As a horizontal cut-off saw, the 49A has a capacity of $3\frac{1}{2}$ " x 6". Swing the head to vertical position . . . it's an upright band saw. No tools required! Use it for cutting angles, slots, notches, bevels and light contour work.

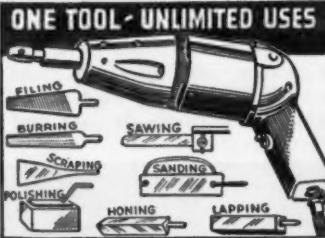
The 49A can save time and money for you. Let your local Wells Distributor show you how . . . or write direct for complete information.



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The Pioneers of Horizontal
**METAL CUTTING
BAND SAWs**
WELLS MANUFACTURING CORPORATION
808 Tyler Street • Three Rivers, Mich.

B-R-E-A-K...
Hand Finishing Bottlenecks
with Portable • Electric
Reciprocating Tools



These handy tools will cut out many tedious hand filing and finishing operations—Increase Production—Produce Uniform Work.

Light in Weight—Delivers $\frac{1}{8}$ " or $\frac{3}{8}$ " fixed stroke at 1000 strokes per minute—Operates on 110 volts AC or DC.

ACME TOOL CORP.
 73 WEST BROADWAY NEW YORK 7, N. Y.

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THE HELIOS

50 EK VERNIER

CALIPER

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

\$9.90

The 55 A with set screw lock with one inch and one Metric scale or all inch scales:

\$8.90

All prices F.O.B. New York

Also available . . .

Dull Chrome finish calipers and Dial Indicator calipers

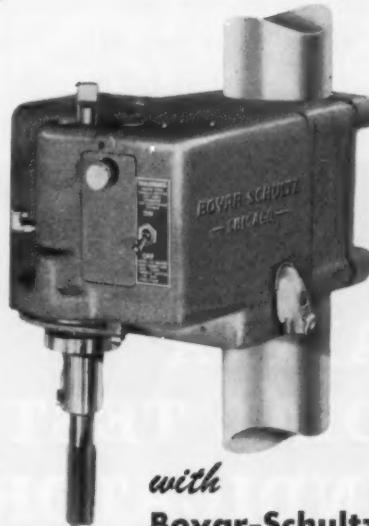
For details on other imported precision instruments, write

**NEISE
MODERNTOOLS**

KARL A. NEISE, Dept. MMS
 404 Fourth Avenue
 New York 16, N. Y.

For more data circle 616 on Postpaid Card
 March, 1958

YOU GET MORE from Your Drill Press



with
Boyar-Schultz

LEAD SCREW TAP- PING ATTACHMENT

CHANGE your ordinary drill press to a precision tapping instrument in minutes.

¶ No special skill required for producing any thread including Class 4. ¶ Long trouble-free life of bronze nut and ground thread lead screw is assured by generous $1\frac{3}{4}$ " diameters. ¶ Accuracy in control of tapped hole depth is assured by electrically controlled reversing switches. ¶ Taps up to $\frac{7}{8}$ " diameter usable with standard adapter bushings. Adapters for taps $1\frac{1}{16}$ " and 2" on special order.

BOYAR-SCHULTZ
 CORPORATION

2020 South 25th Avenue, Dept. T-D
 BROADVIEW, ILLINOIS

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 modern machine shop 307

new shop equipment . . .



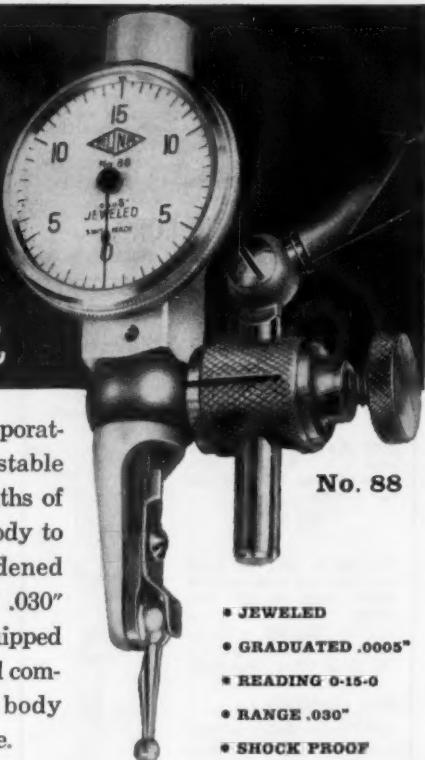
W. and B. Heavy Duty Power Drill

heavier web construction. According to the manufacturer, this makes them

more rigid and sturdy and enables them to withstand considerable stress and strain and to drill successfully. W. and B. Power Drills, in sizes No. 40 to $\frac{1}{2}$ inch, conform to NAS-907 Type C specifications and feature a 135 degree split point for positive, fast penetration. Other sizes have 135 degree points, not split. W. and B. Power Drills are reported especially suitable for portable drilling and the

ALINA DIAL TEST INDICATOR

A fully reversible indicator incorporating a clear easy-to-read, adjustable dial, graduated in half thousandths of an inch, a switch lever on the body to reverse action and TWO hardened chrome plated contact points of .030" and .100" diameter that are equipped with a non-slip ratchet. Furnished complete with a universal shank, body clamp, and plush lined steel case.



WRITE FOR LITERATURE AND COMPLETE CATALOG

ALINA CORPORATION

122 East Second St., Mineola, L.I., N.Y.
For more data circle 618 on Postpaid Card

drilling of such materials as sheet metal, hard steels, stainless steels, titanium, auto bodies and aircraft skin materials.

The size range is from 3/64 to 1/2 inch, A to Z and No. 1 through 60. For more data circle 122 on Postpaid Card

★ modern machine shop ★

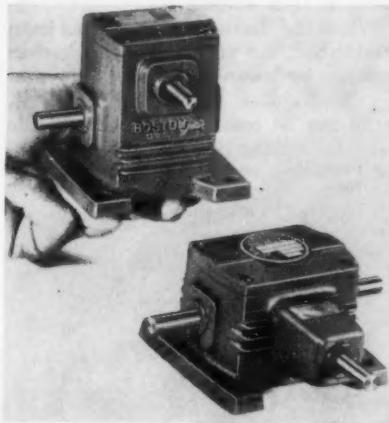
SMALL SIZE REDUCTORS

Three small size speed reducers for light duty applications have been announced by the Boston Gear Works, Quincy, Massachusetts.

The Model R113 is a miter gear reductor with 1:1 ratio and a horizontal right angle drive. It weighs only 3.75 pounds. Its rated output ranges from 0.03 to 0.333 horsepower.

The two other reducers are worm gear assemblies. The Model T109 has been designed with the worm gear over, and the Model U109 with the worm gear under. Ratios for both range from 5:1 to 30:1, and output from 0.03 to 0.08 horsepower.

For more data circle 123 on Postpaid Card



(Above) Boston Model U109 Worm Gear Reductor; (Below) R113 Miter Gear Reductor

REPRINTS AVAILABLE

The following reprints are available free of charge in limited quantities upon letterhead request to this magazine:

"Grinding Jet Blades by Abrasive Belt Method"

"Automatic Drill Feeds Speed Production"

"Forming Aerodynamic Structures"

"Modernize Your Shop and Save Money"

"Producing Critical Airplane Control Components"

"Chill-Shunt Tooling in Tungsten Arc Welding"

"Relief Grinding Twist Drills for Spotfacing"

"Producing Leakproof Check Valves"

"Converting a Grinder to Increase Production"

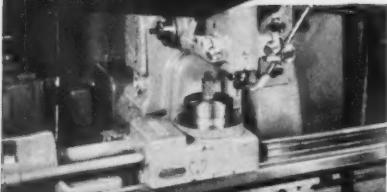
"How to Guarantee Your Own Success"

"Magnetic Chuck Facilitates Drilling Operations"

modern
machine
shop

431 Main St., Cincinnati 2, Ohio

How To Increase Production And Improve Accuracy



With a SUNDSTRAND Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

**Accurate
Spacing,
Powerful
Clamping
Insures
Accuracy**



Sundstrand
Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 589.

SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

For more data circle 619 on Postpaid Card

310 modern machine shop

new shop equipment . . .

HYDRAULIC SPEED CONTROL VALVE RATED FOR 1,000 P.S.I. OPERATION

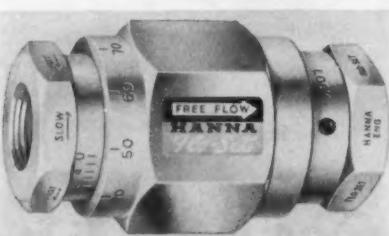
Hanna Engineering Works, 1758 Elston Ave., Chicago 22, Ill., has announced a hydraulic speed control valve called the Flo-Set 1000. It is rated for 1,000 p.s.i. hydraulic operation and is made in $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch sizes.

This valve is used to control the piston speeds of hydraulic cylinders and for controlling the speeds of other hydraulically operated devices. When used with cylinders, these valves allow the instroke and outstroke speeds to be regulated separately. This is accomplished by having a free flow through the valve in one direction and a controlled flow through the valve in the opposite direction.

The flow can be controlled from zero to the desired capacity with only one revolution of the calibrated adjustment sleeve. The sleeve can be turned easily by hand or with the assistance of a wrench.

When the desired flow rate has been established, the valve can be locked in position by means of a set screw and a locking collar. Established flow patterns can be reset by referring to the previous setting of the sleeve.

For more data circle 124 on Postpaid Card



Hanna Flo-Set 1000 Control Valve

March, 1958

GAGE TIP GIVES PROTECTION AGAINST BLOWS FROM ALL DIRECTIONS

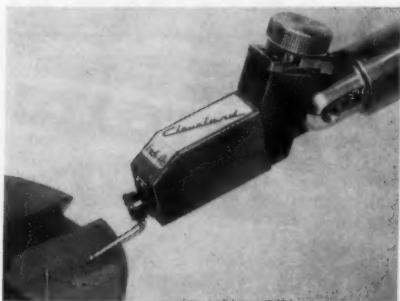
To overcome the danger of damage to high precision gage mechanisms usually considered to be highly fragile, Cleveland Instrument Co., 735 Carnegie Ave., Cleveland 15, Ohio, has developed the Protector Gage Tip. Providing protection against blows from all directions, even head on, this tip and the Cleveland Indi-Ac Electronic Height Gage still remain accurate to millionths of an inch.

Accidental blows from handling or mistakes in setup deflect the gage tip, thus preventing the transmission of the blow and subsequent damage to the gaging element.

In addition, the protector tip increases the versatility of the Indi-Ac Electronic Height Gage by permitting its use in many previously inaccessible areas such as hole or groove bottoms and so on.

The friction loaded ball joint mounting will slip if any pressure greater than 10 to 12 ounces is applied to the gage tip. Normally, gaging pressure is less than $\frac{1}{2}$ ounce, thus the gaging tip will not slip or interfere with normal gaging use.

For more data circle 125 on Postpaid Card



Cleveland Protector Gage Tip in use

March, 1958

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS



ROTARY

STEEL

STAMPS

Single Wheel

3 Rotary Stamps
do away with 40
single Hand Stamps.
Changes of char-
acters are quickly
made merely by
rotating the Type
wheel.

FIGURE ROTARY STAMP

1 2 3 4 5 6 7 8 9 0 X —

(all on one wheel)

furnished in leatherette case.

LETTER ROTARY STAMPS

A B C D E F G H I J K L M &
(on wheel of one stamp)

N O P Q R S T U V W X Y Z —

(on wheel of other stamp)

Size	Figure Stamp One Shank One Wheel	Letter Stamps Two Shanks Two Wheels
1/16"	\$ 8.70	\$26.10
3/32	8.70	26.10
1/8	8.70	26.10
5/32	8.70	26.10
3/16	8.70	26.10
1/4	12.10	36.30
5/16	15.40	46.20
3/8	17.60	52.80

NUMBERALL STAMP & TOOL CO.

HUGUENOT PARK - STATEN ISLAND 12, N.Y.

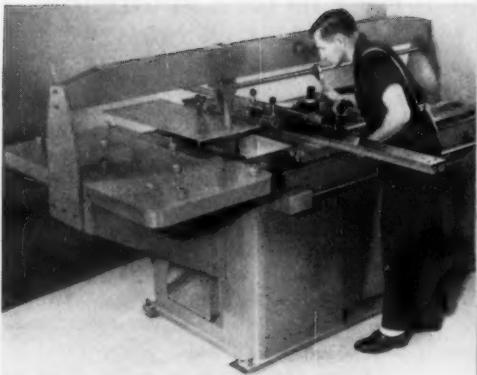
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modern machine shop 311

new shop equipment . . .

**TEMPLATE MACHINE LOCATES
AND DRILLS HOLES
TO 0.002 INCH**

Holes in templates are rapidly located and drilled to within 0.002 inch with a machine announced by the



Wiedemann High Speed Template Machine

Hicks Coordinator Division, Wiedemann Machine Co., 721 Wissahickon Ave., Philadelphia 32, Pennsylvania.

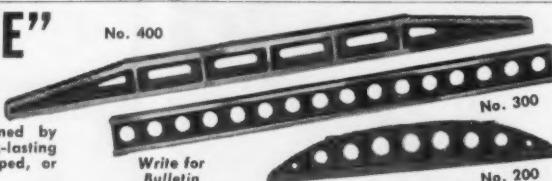
This compact Wiedemann Coordinator machine is also applicable for producing drill jigs, simple fixtures and other precision work in flat sheet metal or plate. It is particularly suited for producing templates up to 36 by 42 inches for Wiedemann Turret Punch Presses and other equipment. The manufacturer claims that holes from $1/16$ to $\frac{3}{8}$ inch diameter are accurately located and drilled in a fraction of the time normally required.

In operation, material is placed against an end stop and secured to a

"MILWAUKEE"

Straight Edges

Made from Meehanite — Fashioned by skilled craftsmen. Famed for long-lasting accuracy. Available planed, scraped, or ground. In sizes up to 14 feet.



J. C. BUSCH COMPANY Engineers & Machinists SINCE 1907
126 E. PITTSBURGH AVE.
MILWAUKEE 4, WIS.

For more data circle 622 on Postpaid Card

cross slide by work positioning clamps. Using a simple X and Y chart for hole locations, the operator sets the dimensions quickly with two optical scanners in conjunction with fixed scales. As soon as location is made, the hole is drilled from the bottom through a carbide drill bushing.

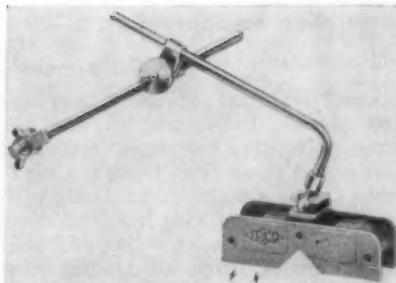
Any number of holes of uniform size can be located and drilled in rapid sequence. There is no accumulative error, since all dimensions are from a zero reference point to X and Y coordinates.

For more data circle 126 on Postpaid Card

* modern machine shop *

MAGNETIC HOLDERS

Trico Fuse Manufacturing Co., Milwaukee, Wis., recently introduced its magnetic holders which offer a wide



Trico Holder with ball in socket action

variety of uses on production jobs. The powerful magnetic base attaches itself to iron or steel surfaces, thus eliminating drilling of holes for mounting brackets and haphazard clamping arrangements, in addition to saving time and effort. They are handy for

Pneumatic

BEVERLY

THROATLESS SHEAR

FASTER, EASIER CUTTING
to any Shape!

- Compactly built for maximum visibility and efficiency
- Operates on 35 to 150 PSI air pressure
- Adjustable power and return stroke length and speed

Beverly Pneumatic Shears combine all the advantages of Beverly Throatless Shears with fast, effortless cutting action through air cylinder operation. Air operation speeds work, permits accurate cutting to a pattern or template, as operator can concentrate on guiding work through the shear. Flow control valves permit precise adjustment of stroke speed; adjustable actuating arm controls stroke length. Foot Switch permits operator to use both hands on the work piece. Operates on 110V, 60 cycles AC and 35 to 150 PSI air pressure.

See your nearby Beverly Distributor

Write for catalog sheet and complete details.

BEVERLY SHEAR MANUFACTURING CO.
3000 W. 111th STREET • CHICAGO 43, ILLINOIS

new shop equipment . . .

holding brackets, indicators, magnifying glasses, flashlights, oil and air lines, blueprints or tags, retrieving parts, and so on. Two types are available. One is a magnetic base only with a sturdy bolt and wing nut. The other has a ball and socket action and double adjusting arms for holding mist nozzles or any other object at any angle or direction.

For more data circle 127 on Postpaid Card

★ modern machine shop ★

HIGH SPEED, DIAL TYPE UNIVERSAL MILLER

The Index Industrial Corp., 150-MM Broadway, New York 38, N. Y., has announced that the Dormac High Speed, Dial Type, Universal Milling



Dormac Dial Type Universal Milling Machine

Machine is now available for prompt delivery.

Main features of this machine are: hardened and ground gears; hardened and ground spindle; power feeds and power rapid traverse in all directions; National Standard Spindle; and a climb milling arrangement as standard equipment.

Major specifications are as follows: table sizes either 12 by 51 or 12 by 60 inches; No. 50 National Standard Taper Spindle, 12 speeds, 27 to 1,540 r.p.m.; 12 feeds.

Standard equipment includes: main motor, feed motor, controls, pump motor and piping, arbor, arbor supports, built-in clutch, climb milling arrangement, handles and wrenches.

For more data circle 128 on Postpaid Card

ALL-WAY* LEVEL to 5 seconds

**Saves Time, Insures Accuracy
for Machinery Builders
and Users**



The FELL® PRECISION LEVEL shows the level of all directions at once to an accuracy of .0003 inch per foot or 5 seconds of arc. Other sensitivities are available. Made in sizes 3½" x 6" and 5½" x 12"; also 4" and 5" dia. for fixed mounting. Patented and patents pending.

*Trade Marks Reg.

Write for Circular

W.M.B. FELL CO.
320 McLAIN AVE. ROCKFORD, ILL.

For more data circle 624 on Postpaid Card

314 modern machine shop

★ modern machine shop ★

PROCESS PRODUCES PROFILE BLENDED OR STRAIGHT CHAMFERS ON GEAR TEETH

A Red Ring process for producing profile blended or straight precision

March, 1958

chamfers on the tips of gear teeth has been developed by National Broach and Machine Co., 5600 St. Jean, Detroit 13, Michigan.

Initially designed for marine type gears, the process can be applied to any type of spur or helical gear teeth to either provide nickproof chamfered surfaces at the tips of the teeth or remove burrs at the tips left by gear tooth production processes. The process makes use of a specially designed rotary chamfering tool, which is mounted on the cutter spindle of a conventional rotary gear shaving machine in mesh with the gear to be chamfered. The chamfering operation is performed by means of reciprocating and rotating the tool, while feeding it to tight mesh depth.

The chamfering tool assembly is made in a variety of sizes, having curved or angular shaped tooth forms made to generate a specific profile blended or straight chamfer on the tips of the teeth.

The high speed steel rotary chamfering tool is assembled within a split guide gear.

The chamfering tool proper is serrated like a shaving cutter. The

gear that encases the tool meshes with the gear to be chamfered and acts as a timing or guiding device to assure the production of precision, balanced chamfers on the gear teeth.

The timing gear portion of the tool is split so that one-half can be adjusted with wrenches in a circular direction to provide the desired tooth thickness. In this manner, the amount of chamfer on the gear teeth is automatically controlled by feeding the tool

NEW HIGH ACCURACY
TORQUE MEASURING INSTRUMENT

**LOW-TORQUE
HAND GAUGE**



WATERS *TORQUE WATCH GAUGES now put measurement of low starting and moving torques on a production line basis. NEW specially designed chucks will hold shafts up to $\frac{1}{4}$ " diameter, as short as $\frac{1}{16}$ ". Simple one-hand operation and easy-to-read dials speed accurate readings. Costly, time-wasting, inaccurate laboratory "lash-ups" are eliminated.

Send for Bulletin and Prices

*DESIGN PATENT 177889

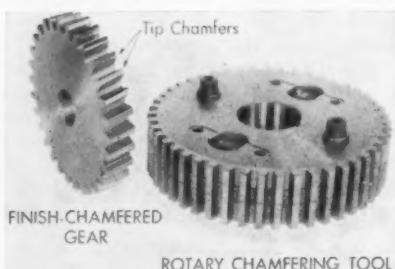
Waters Manufacturing, Inc.
BOSTON POST ROAD, WAYLAND, MASSACHUSETTS



For more data circle 625 on Postpaid Card

modern machine shop 315

new shop equipment . . .



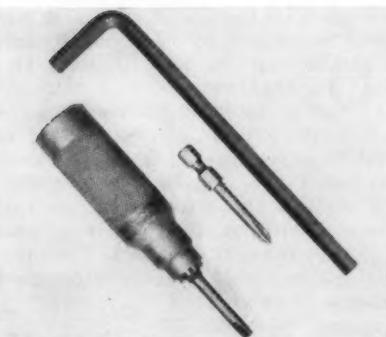
Red Ring Tool produces profile blended or straight chamfers on tips of gear teeth

into tight mesh with the gear during the chamfering operation.
For more data circle 129 on Postpaid Card

★ modern machine shop ★

HAND SCREWDRIVER WORKS TO PRESET TORQUE

The Safe-Torque Hand Operated Screwdriver, developed by Scully-Jones and Co., 1909 South Rockwell St., Chicago 8, Ill., has been designed for applications requiring a specified torque. Built to industrial standards with a roller drive clutch for applica-

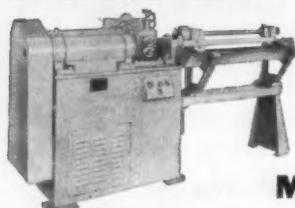


Scully-Jones Safe-Torque Hand Screwdrivers

tions in the range of 0 to 25 inch pounds, it is ideal for precision assembly production and maintenance jobs where air or electric powered tools are either unavailable or cannot be used due to space requirements, safety regulations and so on. Typical areas of application include: industrial instruments, aircraft controls, missiles, appliance controls and electronic equipment.

Since the basic design is extremely simple, trouble free operation is assured. Equally spaced rollers are wedged between the inner cam drive and the outer shell or body with application of the driving force. All parts deform elastically when the rollers climb into the wedging position.

NEW



variable speed, electrically controlled, AUTOMATIC
**SHUSTER 2AV Wire Straightening
and Cutting Machine.**

Capacity: $\frac{1}{16}$ " to $\frac{5}{16}$ " mild steel wire; $\frac{1}{16}$ " to $\frac{3}{16}$ " high tensile wire, 50 to 200 FPM.

Send for details on this high speed, low cost, SHUSTER. Ask for quotes on your wire straightening and cutting needs for any wire sizes from .020" to $1\frac{1}{16}$ ".

METTLER Machine Tool, Inc.

157 Adeline St., New Haven, Conn.

For more data circle 626 on Postpaid Card

When preset torque is reached, the rollers override the high points on the inner cam drive and roll into a "free" position so that further tightening of the screw is impossible. Because the operator can feel and hear this overriding action, he is immediately aware that the fastener job is securely in place.

Safe-Torque Screwdrivers are adjusted to maximum torque at the factory, with lower torques required by particular jobs being set by turning the adjusting screw counterclockwise. Each calibration on the torque adjusting screw represents approximately 1 inch pound of torque.

A nylon insert prevents movement of the calibrated socket head adjusting screw once it is adjusted to the proper torque for the job. Thus, identical torque is assured on each screw. Sliding friction is never a factor because all contacting, driving members roll on each other.

Because the torque setting, not the operator, determines the exact degree of tightness, there is no need for guess-work in precision assembly. Even

when working with relatively soft non-ferrous screws, stripped threads and damage to screw heads are virtually eliminated.

Operation in either direction is equally satisfactory. Precision and reliability are provided at minimum cost. Each Scully-Jones Safe-Torque Hand Screwdriver is provided with a hex wrench for torque adjustment and one standard Apex bit specified by the

TOOL SHOW in print

The May 1958 issue of MODERN MACHINE SHOP will feature the show sponsored by the American Society of Tool Engineers in Philadelphia from May 1 to 8.

This May issue will contain a program of the technical sessions, floor plans and a list of exhibitors.

A major feature will be illustrations and descriptions of tools and equipment on display . . . a preview of the newest products available.

**Send in your advertising
space reservation early.
Deadline is April 1.**

modern machine shop
431 MAIN ST. CINCINNATI 2, OHIO

new shop equipment . . .

customer. Apex and other standard $\frac{1}{4}$ inch hexagon drive bits, shanks and sockets for Phillips head, slotted head, clutch head, socket head and hex head screws can be used in the Safe-Torque Hand Operated Screwdriver.

For more data circle 130 on Postpaid Card

★ modern machine shop ★

GAGE PINPOINTS CHANGES OF THICKNESS

Low intensity x-rays in split-second pulses scan film and foil speeding by at least 100 feet per second, and measure strips 0.0002 inch thick with accuracy of millions of an inch in a gage developed by The Sheffield Corp., Dept. 12, Dayton 1, Ohio.

By using pulses instead of continuous radiation, this Measuray Gage



Sheffield Measuray Gage is shown in use

pinpoints changes of thickness even at extremely high speeds of strip production. At 600 pulses per second the x-ray gage provides an individual thickness reading every third of an inch on foil fed through at 1,000 feet per minute.

This gage has been designed to measure instantly and accurately a

TOOL SHOW in print . . .

The May 1958 issue of MODERN MACHINE SHOP will feature the show sponsored by the American Society of Tool Engineers in Philadelphia from May 1 to 8.

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A major feature will be illustrations and descriptions of tools and equipment on display . . . a preview of the newest products available.

Send in your advertising space reservation early.

Deadline is April 1.

modern machine shop

431 MAIN STREET

•

CINCINNATI 2, OHIO

wide range of materials produced in continuous strips. These include plastic film, foils made of steel, aluminum, copper or brass, as well as sheet and bar stock. The gage will take up to 36,000 individual readings per minute on strips of these materials.

The x-ray pulse passes through a strip that comes between the emitter and receiver of the scanning unit. The receiver detects and amplifies the x-ray energy that manages to get through. A slight increase in thickness means less energy received. Detecting and amplifying this difference, the gage then registers it on an indicator in millionths of an inch or as deviation in percent, plus or minus.

Negligible wiggle, or random movement, of the indicator needle makes the Measuray Gage easy to read. The indicator is located in a remote control station. X-ray scanning unit and main power cabinet make up the rest of the Measuray x-ray thickness gage. Its ultra-fast cycle allows the gage to make use of high speed electronic counting, marking and sorting de-

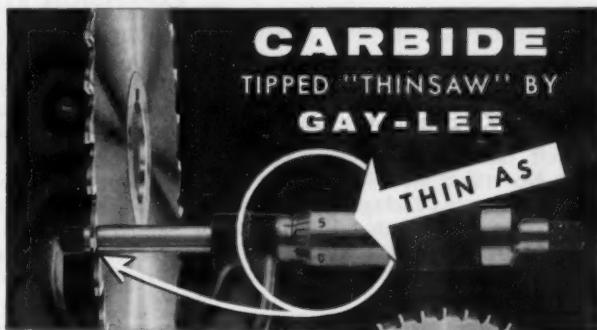
vices. It can also be used with production analyzers, automatic thickness controllers, recorders and totalizers.

For more data circle 131 on Postpaid Card

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TOOLHOLDER FOR CARBIDE TOOL BITS

Aloris Tool Co., Inc., 419 Getty Ave., Clifton, N. J., has announced the



Ideal for precision, high-production sawing, slitting, slotting! Exclusive Gay-Lee design features long-wearing carbide tips brazed into a circular seat which provides more brazing area, greater mechanical strength and maximum tip security. (Patented, U. S. Pat. No. 2675603, manufactured under license.)

- Thicknesses low as .030"
- Thickness tolerance can be held to .0001"
- Wafer-thin for the most delicate work
- Maintain positive alignment and rigidity
- Cut to full depth without runout
- O. D. from 1½" to 10"
- Available in any carbide grade
- Made to any tooth form

CARBIDE SAW SPECIALISTS

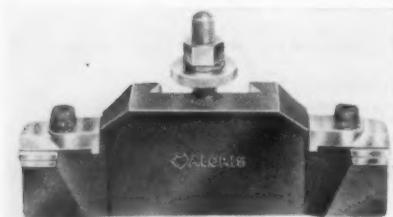
GAY-LEE
COMPANY
CLAWSON • MICHIGAN



Write for free literature, send us details of your problem, or bring your problem to Gay-Lee Booth No. 1919, A.S.T.E. Exposition, Philadelphia, May 1-8, 1958.

For more data circle 629 on Postpaid Card

new shop equipment . . .



Aloris Toolholder for carbide tool bits

introduction of three toolholders for carbide tool bits: No. 12, for right hand turning; positive rake; No. 14, for left hand turning; and positive rake; No. 16, 2 in 1 for both right hand turning and facing. These Aloris Toolholders for carbide triangular inserts feature a rugged, adjustable chip-breaker clamp which speeds indexing

of inserts. The holder is of heat treated alloy steel for extra strength and has a hardened tool steel replaceable seat; dissipates heat; protects holder; positive rake means less pressure on the tool and less power required.

For more data circle 132 on Postpaid Card

★ modern machine shop ★

CARBIDE TIPPED EXPANSION REAMER

Staples Tool Co., 2851 Massachusetts Ave., Cincinnati, Ohio, has recently announced a new design of carbide tipped expansion machine reamers, which incorporates several new design features.

A new method of expansion is claimed to assure rigidity that, at all times, compares with that of a solid body reamer. Expansion, to compensate for wear, can be accurately controlled, and

DISTRIBUTORS WANTED!

Select Franchises Available

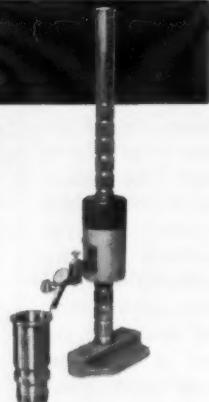
Multi-purpose Height Masters are portable, completely self-contained instruments. Specifically designed for use in precision layout work, inspection, checking jigs and fixtures, or wherever fast and highly accurate height measurement is a prime necessity.

NO GAGE BLOCKS, TRANSFER MEASURING EQUIPMENT, OR REFERENCE GAGES OF ANY KIND ARE REQUIRED.

PACIFIC GAGE OFFERS:

- Exclusive territories.
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- Specialized accessories increase earnings.

Precision-built in sizes from 17" to 72",
Certified accurate to .000050".



Write today—regardless of what lines you carry—for more details concerning Pacific Gage's distributor plan.

PACIFIC GAGE, INC.

A Division of Darco Industries, Inc. 2151 E. Rosecrans Ave. El Segundo, Calif.

For more data circle 630 on Postpaid Card



Stainless Carbide Tipped Expansion Reamer

is claimed to always be uniform throughout the length of the cutting blades. The manufacturer states that extended tool life can be expected.

The cutting element can be replaced quickly and economically by removing a worn out shell and installing a new one.

These expansion reamers are made in several styles and are available in a wide range of sizes.

For more data circle 133 on Postpaid Card

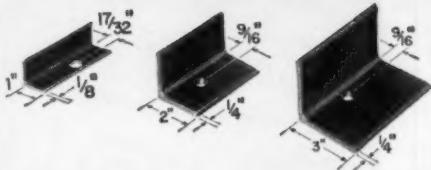
TAPER SPINDLE ADAPTER AND COLLET ADAPTIONS

Hall Manufacturing Co., 622 Tulerosa Drive, Los Angeles 26, Calif., has announced that full spindle capacity up to 2-1/6 inches is now possible for taper spindle lathes, using the Hall Adapters in sizes L-00, L-0 and L-1 with Model B Hall 2 inch collet chucks.

In addition, all collet adaptions can now be used with all Hall Collet Chucks. This includes 5-C collets, 5-C pot chucks, Warner and Swasey No. 3 pads, expanding internal plugs, Hall Model A and B Collets. When the 5-C, 5-C pot chucks or expanding plugs are used in Hall Collet Chucks, there is no lateral movement; that is, the collet moves neither forward nor backward. This means unusual accuracy in holding length, as well as concentricity. The collet adaptions come with an adjustable stop. Where 5-C

PUNCH ANGLE IRON CLOSE TO WEB

WHITNEY-JENSEN
No. CTW 20
BALL BEARING PUNCH

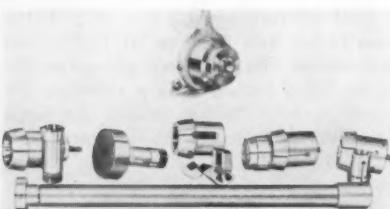


WHITNEY METAL TOOL COMPANY
720 Forbes St., Rockford, Ill. Since 1910

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new shop equipment . . .



Model B Collet Chuck (top); Hall Collet Chucks take these adaptors (bottom).

collet adaption cannot be used, then the tube is employed.

For more data circle 134 on Postpaid Card

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MULTIPLE SPINDLE DRILLING AND TAPPING MACHINE

National Automatic Tool Co., Inc., Richmond, Ind., has developed a standard multiple spindle drilling and tapping machine which has replaced three gang drills at the Plymouth Division, Burroughs Corporation.

This machine drills, counterbores and taps seven holes in each part. The Natco Model H-6 has 24 adjustable spindles, 21 of which are used in this operation—seven for drilling, seven for counterboring and seven for tapping.

The Leading Machine Tool Manufacturers use

RUTHMAN
GUSHER
COOLANT PUMPS
THE RUTHMAN MACHINE CO.

Model UL 7120
1817 READING ROAD CINCINNATI 2, OHIO

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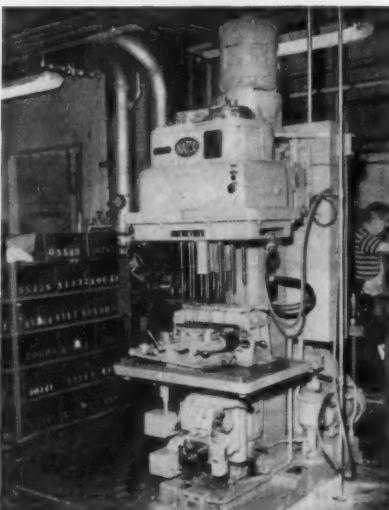
322 modern machine shop

The spindles accurately locate holes, and jigs are eliminated. Work is handled in a three position sliding fixture, arranged with interlocks so that operations must be conducted in the proper sequence.

Besides important savings on the part for which this machine is tooled, almost 1,000 hours are available for other work. Because spindles can be easily relocated for other jobs, the machines are extremely versatile.

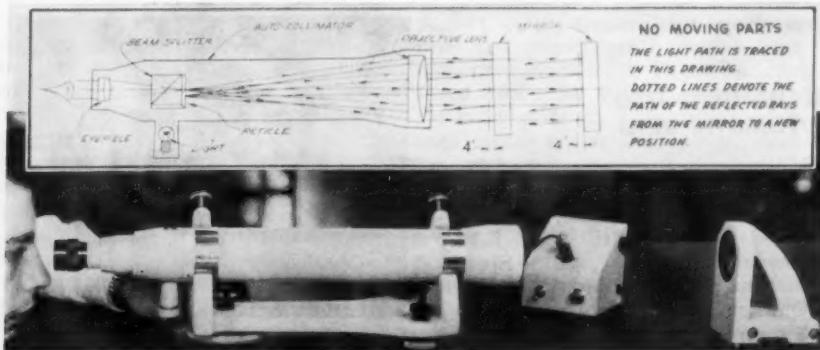
Depending upon the part and the production rate required, fixtures can be of the sliding type, multiple position, box type, circular—either hand fed or automatic. According to the manufacturer, they can be applied to jobs involving as few as two holes—in addition to their more widely known application to jobs involving numerous holes. Standard Natcos are available from 1 horsepower, 10 spindle models to 50 horsepower machines with up to 72 spindles.

For more data circle 135 on Postpaid Card



Natco Drilling and Tapping Machine

March, 1958



George Scherr Opto-Tooling-Auto-Collimator which has been designed for shop use

COLLIMATOR READS TO ONE SECOND OF ARC

The Opto-Tooling-Auto-Collimator, employing the science of optics for shop use, has been introduced by the George Scherr Co., Inc., 200-MM Lafayette St., New York 12, New York.

The Opto-Tooling-Auto-Collimator reads directly to one second of arc, 5 millionths of an inch. It eliminates the need for sine bars, tables of sines and involved calculations previously necessary to establish angles. Testing surface flatness of machine beds, checking squareness of surfaces, measuring alignment of centers and squareness of axis to ways, testing angles on jigs and fixtures, checking straightness of bores, checking faces for parallel-

ism and optical instrument assembly alignment are just a few of the many difficult and delicate jobs this Opto-Tooling-Auto-Collimator will do. By means of this equipment, a shop rotary table will become a precise optical indexing table, capable of indexing and repeating to one second of arc.

The Opto-Tooling-Auto-Collimator is offered in a "B" unit having a working range of up to 15 feet from the auto-collimator. The "D" units have an unlimited distance range. Various models have a total field of 30 minutes of angle directly reading to 15 seconds of arc, 10 minutes of angle directly reading to 5 seconds of arc and 9 minutes along one axis only directly reading to 1 second of arc.

For more data circle 136 on Postpaid Card



10 to 20 Times Longer Cutting Life Means Lower Tool Costs

"DIXIE" provides End Mills of solid carbide with cutting edges processed with exclusive "Micro-Finish" to assure the user of long-lasting, super sharp tools.

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FOR PRECISION FINISHING



DIE SINKING, HOLE SIZING AND CUSTOM TOOLING



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BRIDGEPORT, MICHIGAN

new shop equipment . . .

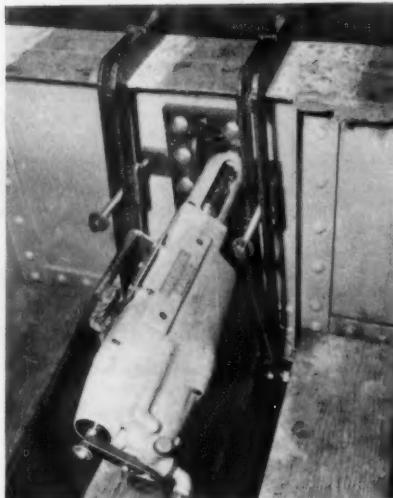
MECHANICAL FEED AUTOMATIC DRILL

Machine tool precision has been combined with portable tool convenience in the Buckeye-Matic, a mechanical feed, automatic drill developed by Buckeye Tools Corp., 5013 Springboro Pike, Dayton, Ohio.

Once started, this tool goes through the complete drilling cycle, including retraction and stopping, automatically. Designed for applications where drilling is done at several points on a large workpiece, it may also be used with permanent fixtures, where work would be brought to the tool.

Rated capacity is 1½ inches in steel, larger in aluminum and softer materials; maximum stroke of 6 inches can be adjusted downward by a micrometer screw. Exclusive mechanical feed in the Buckeye-Matic insures forward progress as long as the drill rotates. This feature is essential in automatic drilling, as many metals will work-harden if heated by a twist drill turning without cutting. An overload relief mechanism automatically starts retraction and shut-off cycle if an obstruction or broken twist drill subjects work spindle to overload thrust condition.

The Buckeye-Matic is adaptable to drilling, reaming, boring, counterboring and countersinking. Accuracy and clean, sharp breakthrough are said to be assured even on the toughest materials, including many of the new al-



Buckeye-Matic Mechanical Feed Automatic Drill

loy steels, heat treated to 48 to 54 Rockwell C.

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GREASE LUBRICATES BEARINGS AT 600 DEGREES FAHRENHEIT

To meet the high speed and high temperature lubrication requirements of supersonic aircraft and missiles plus sea and land equipment, the Shell Oil Co., 50 West 50th St., New York 20, N. Y., has developed an Extreme Temperature Grease with an operating range from minus 45 to 600 degrees Fahrenheit. This grease has the following designations: ETR Grease B and ETR Grease D.

In addition to its high temperature range, the grease is water resistant, has an extremely low evaporation rate and excellent mechanical stability.

Development of the greases required a reappraisal of available gelling

COMMERCIAL CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 28 years serving industry. Also mfgs. of Por-Matic drill fixture. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 634 on Postpaid Card

agents and oils, since conventional soaps and mineral oils could not offer the necessary thermal and oxidative stability. At high temperatures, gelling agents melt and run out, leaving metal parts without lubrication. A silicone fluid was selected because it possessed the required volatility, oxidation stability and viscosity—temperature characteristics. Of all the grease thickeners, the vat dyes proved most stable for high temperature operation and are used in the Shell ETR grades.

For more data circle 138 on Postpaid Card

★ m m s ★

SHELL END MILLS AND FACE MILLS

Inserted blade shell end mills and face mills, utilizing $\frac{1}{2}$ and $\frac{3}{4}$ inch square standard throw away carbide inserts, have been introduced by the Viking Tool Co., 1000 Nichols Rd., P. O. Box 471, Shelton, Connecticut.



Viking Milling Cutter

March, 1958

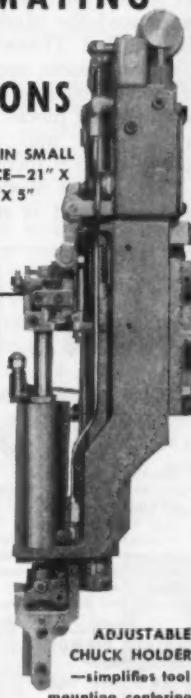
This line of milling cutters is being produced initially with double negative rake angles. A hardened high speed steel anvil is located in back of the cutting insert. This anvil is fastened to the cutter body by a retaining screw, to prevent disassembly during indexing or replacement of the insert. The anvil also provides a hard, ground seat for the insert, and can be replaced. A dual threaded screw actuated wedge provides easy insert in-

SAVE TIME AUTOMATING SMALL PARTS ASSEMBLY OPERATIONS

SPECIFY

DIXON *"Auto-Positioner"*

FITS IN SMALL
SPACE—21" X
3 $\frac{1}{4}$ " X 5"
DEEP



ADJUSTABLE
CHUCK HOLDER
—simplifies tool
mounting, centering

- STANDARD HEAD DESIGN—Saves engineering time. Easy to apply to variety of jobs. Operates on ordinary 80# air pressure, 110 volts. Has machined T-slot surface, simple adjustments. Tooling, mounting column, feeders, etc., optional.
- BUILT-IN SENSING—Acts as automatic inspector, assures quality production. Machine stops if part is missing or malformed.
- FAST, VERSATILE—Handles wide range of feedable metal or plastic parts from $\frac{1}{16}$ " to 3" O.D. at speeds up to 100 cycles per minute. Easy to tool.
- PRECISION-BUILT—Sturdy frame, one-piece super-finished piston and rod, cushioned air cylinder, J.I.C. controls.



WRITE FOR FULL DATA—New circular gives complete specifications, shows typical applications.

DIXON AUTOMATIC TOOL, INC.
2314-23rd Avenue • Rockford, Illinois

Equipment for Automatic Parts Handling and Assembly

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new shop equipment . . .

dexing. Generous chip room is provided along with close blade spacing to provide high feed rates.

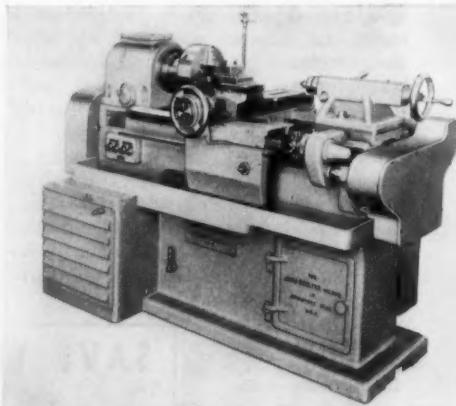
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THREADING MACHINE FEATURES AUTOMATIC CYCLE

The James Coulter Machine Co., 141 James St., Bridgeport, Conn., has announced the Model B Single Point, High Speed Threading Lathe, which is an automatic mechanically operated model, capable of producing internal threaded pieces of up to 10 inches in diameter and external threaded pieces up to 6 inches in diameter.

The Coulter Model B is 80 by 36 by 48 inches and is equipped with a 3



Coulter Model B Single Point High Speed Threading Machine features automatic cycle

h.p. motor. It has a 24 inch capacity between centers with a maximum swing over the cross slide of 6 inches and a bed swing of 14 inches. Its standard spindle with a 10 inch chuck, either air or hand operated type, has infinite speed ranges of 250-1,000, 150-600, 125-490 with special speeds, if so required.

In addition to being completely automatic the Model B incorporates operational features usually found only in a combination of several machines. Among the outstanding of these features are: (1) a skip feed mechanism for producing multi-start threads of 2, 3, 4, 6, 8 and 12; the skip feed mechanism also controls the acceleration rate of feed; (2) a conveniently located control to permit easy maneuvering of the carriage positioning; and (3) an infinite speed control for changing spindle speeds.

Other operational features of the Model B include: simple, quick changeovers; worm gear drive to operate spindle; simple single point tool and commercial toolholder; precision anti-friction bearing mounted spindle;

Cut Drill Costs!

Eliminate expensive "outside" sharpening . . . or time-costly "hand-sharpening"! BLACK DIAMOND (up to $\frac{3}{4}$ " Drills) or WORCESTER (up to $2\frac{1}{2}$ " Drills) DRILL GRINDERS are always set up to sharpen 1 or 100 drills . . . change sizes in seconds. Your most inexperienced man (or woman) can easily restore like-new sharpness to dull drills in ten seconds, and pay for your unit in months!

BLACK DIAMOND

SAW & MACH. WORKS
71 North Avenue
Natick, Mass.

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March, 1958

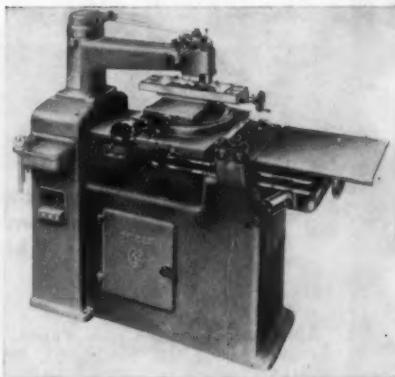
anti-friction live center in tail stock
and motor driven coolant pump.
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★ modern machine shop ★

MILLER PRODUCES FLAT TEMPLATES FOR ALL TYPES OF MACHINES

A milling machine, developed for the economical and accurate production of flat templates, is now available from Cosa Corp., 405 Lexington Ave., New York 17, N. Y. This machine, the Studer SFM 500, will produce flat templates for Studer and other profile grinding machines—also for all types of copy lathes and copy millers.

Operating on the coordinate principle, the Studer SFM 500 is provided with longitudinal and traverse slides. These are positioned accurately by means of precision scales and microscopes reading to 0.0004 inch. The range of the setting optical system is 20 by 8 inches. For producing cam type templates, a rotary table is mounted on the traverse slide. This rotary table is graduated in 360 degrees and is controlled by a worm drive. One turn of the handwheel equals but 2 degrees—providing a high degree of dividing accuracy. It is claimed that a reading of 15 seconds of an arc can be easily obtained.



Studer SFM 500 Template Milling Machine

Incorporated into the vertical spindle is a taper sleeve to accommodate collets and center punches. A three position turret, fitted with adjustable stops, is also provided for depth control. By means of the center punch, all initial and end points of straight lines and arcs, and centers of circles, are transferred to the sheet metal according to their coordinates. When the spindle is raised, a centering microscope automatically swings into position in line with the spindle axis. This enables the workpiece to be set accurately for milling in conjunction with previously made punch marks or scribed lines. Milling is then performed by the setting optical system.

For more data circle 141 on Postpaid Card

For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 328, 330, 332 and 333.)

modern machine shop
431 MAIN STREET • CINCINNATI 2, OHIO

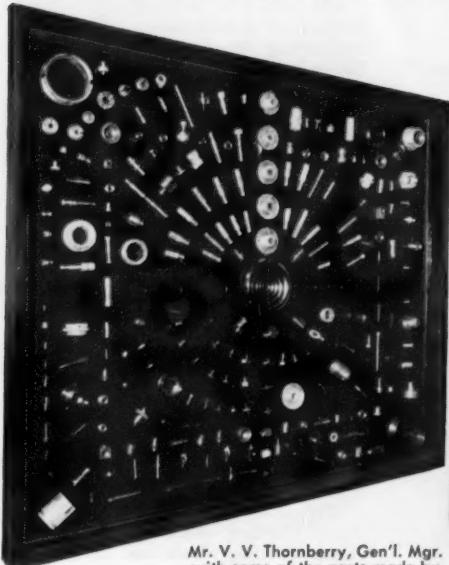
where
to
get it

where to get it

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Critical aircraft tolerances "duck soup" with



Mr. V. V. Thornberry, Gen'l. Mgr.
with some of the parts made by
Carmel Screw Products Co.

Buck[®] AJUST-TRU

POWER CHUCKS



INDIANA FIRM
BUILDS PRECISION
REPUTATION
SPECIALIZING ON
AIRCRAFT PARTS



65% of the more than 200 parts on this display are made with the 7 Buck Power chucks used by the Carmel (Ind.) Screw Products Co., specialists in aircraft parts.

Typical comments by Mr. V. V. Thornberry on Buck performance include: "We thread class 4 tolerances with face run-out held within .001" (and less) indicator reading of pitch line of thread" ... (another job) "Tolerances are held to better than the Buck guarantee of .001" precision in relation to bore and face with no difficulty..."

At Carmel the Buck Jaw Turning Fixture is used to fabricate jaws in the tool room without having to tie up a production machine.

More and more firms every day are learning that "*It pays to chuck with Buck.*" Send for catalog — see why.

Buck
POWER CHUCKS



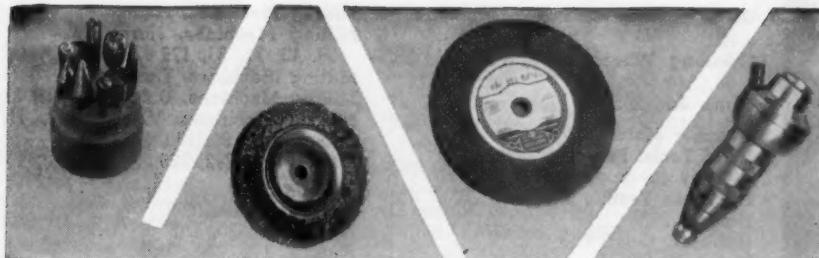
6½"-8¼"-10"-12"

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BUCK TOOL COMPANY

314 SCHIPPERS LANE • KALAMAZOO, MICH.

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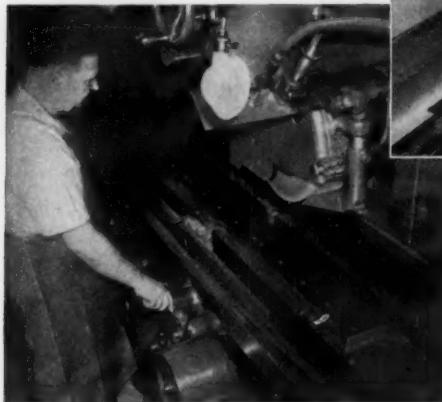
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12	42	72	102	132	162	192	222	252	282	312	338	364	390	416	446	476	506	536	566	596	626	656	686
13	43	73	103	133	163	193	223	253	283	313	339	365	391	417	447	477	507	537	567	597	627	657	687
14	44	74	104	134	164	194	224	254	284	314	340	366	392	418	448	478	508	538	568	598	628	658	688
15	45	75	105	135	165	195	225	255	285	315	341	367	393	419	449	479	509	539	569	599	629	659	689
16	46	76	106	136	166	196	226	256	286	316	342	368	394	420	450	480	510	540	570	600	630	660	690
17	47	77	107	137	167	197	227	257	287	317	343	369	395	421	451	481	511	541	571	601	631	661	691
18	48	78	108	138	168	198	228	258	288	318	344	370	396	422	452	482	512	542	572	602	632	662	692
19	49	79	109	139	169	199	229	259	289	319	345	371	397	423	453	483	513	543	573	603	633	663	693
20	50	80	110	140	170	200	230	260	290	320	346	372	398	424	454	484	514	544	574	604	634	664	694
21	51	81	111	141	171	201	231	261	291	321	347	373	399	425	455	485	515	545	575	605	635	665	695
22	52	82	112	142	172	202	232	262	292	322	348	374	400	426	456	486	516	546	576	606	636	666	696
23	53	83	113	143	173	203	233	263	293	323	349	375	401	427	457	487	517	547	577	607	637	667	697
24	54	84	114	144	174	204	234	264	294	324	350	376	402	428	458	488	518	548	578	608	638	668	698
25	55	85	115	145	175	205	235	265	295	325	351	377	403	429	459	489	519	549	579	609	639	669	699
26	56	86	116	146	176	206	236	266	296	326	352	378	404	430	460	490	520	550	580	610	640	670	700
27	57	87	117	147	177	207	237	267	297	327	353	379	405	431	461	491	521	551	581	611	641	671	701
28	58	88	118	148	178	208	238	268	298	328	354	380	406	432	462	492	522	552	582	612	642	672	702
29	59	89	119	149	179	209	239	269	299	329	355	381	407	433	463	493	523	553	583	613	643	673	703
30	60	90	120	150	180	210	240	270	300	330	356	382	408	434	464	494	524	554	584	614	644	674	704

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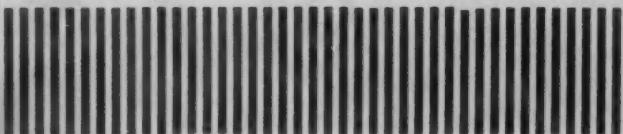
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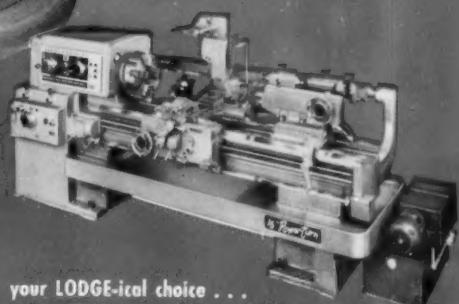
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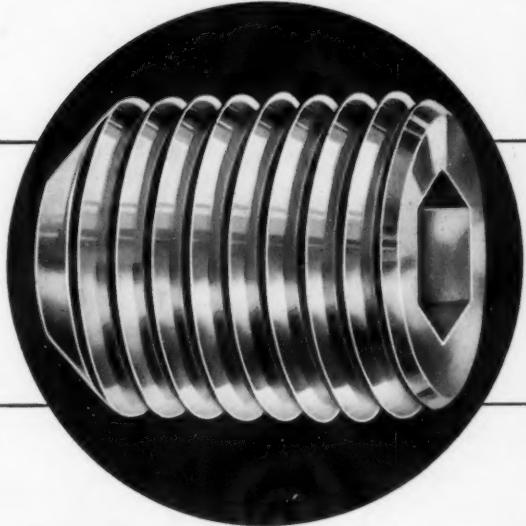
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